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AUTHOR Arata, Luis O.
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ABSTRACT

These materials provide narratives about selected topics of cultural importance in the Hispanic world from the pre-Columbian past until after the Spanish conquest. The materials are designed for enrichment of current programs, and can be used in a variety of areas by elementary school teachers. The topics are treated in a story format so that history appears like an adventure with a certain logic that the students can uncover and form opinions about. Each narrative is followed by suggestions for further exploration and a bibliography to help teachers to obtain additional materials for more in-depth coverage. Sixteen theme studies are included: (1) Babel Bookstore; (2) At Sea; (3) The Desert; (4) The Lost Treasure of El Dorado; (5) Real Treasures; (6) Geographies; (7) Maps; (8) Lost Continents; (9) Numbers; (10) Quetzal; (11) The Maya; (12) Popol Vuh; (13) Columbus; (14) Hernan Cortes; (15) The Way to Quezaltenango; and (16) Waiting for Viracocha. (DB)

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HISPANIC CULTURAL THEME STUDIES FOR ELEMENTARY SCHOOLS

by Luis O. Arata
Assistant Professor of Modern Languages
Quinnipiac College
Mount Carmel Avenue
Hamden, CT 06518-0569

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PREFACE

These Theme Studies arose from a perceived need to enrich the teaching of Hispanic culture at the elementary level. The original intent was to cover topics from the entire breath of Hispanic culture. The reach proved to be far too wide, so I decided to focus only on the period going from pre-Columbian times till the end of the conquest. This happens to be one of the common roots of all Hispanic peoples in the Americas. It is only fitting that within the rich cultural diversity of the United States we celebrate those origins that are now a living part of our nation.

The Studies are primarily addressed to teachers for enrichment. What I consider the most important part of the Studies is their story-like format. This should be the rallying point to get students to play with materials presented. I wish teachers to have as much fun as I did in finding ways to best convey the richness of the historical topics covered.

These Theme Studies would not have come to light without the inspiration and guidance of the teachers and scholars I had the distinct pleasure of working with. My thanks go to the Cold Spring School teachers Violet Talbot, Penny Serafin, Mabel Praderio, Karen Zwick, Tim Blauvelt and the director of this independent school in New Haven, Irene Fiss. Thanks as well to Dr. Kay Hill and Raquel Bonessi of the New Haven Public Schools. Their input as educators helped make this work more suitable for teachers.

Dr. Mary Miller of Yale University and Dr. Dorothy Joba of the Glastonbury Public School system not only guided me throught a maze of information about the period covered by the studies, but also told me images that turned to stories. Dr. Susan Holloway and Dr. Catherine Fosnot of the Center for Constructivist Teaching at Southern Connecticut State University provided invaluable suggestions on classroom activities.

Finally I wish to thank Dr. Elizabeth Mahan of the Center for Latin American and Caribbean Studies at the University of Connecticut, Karen Gill, and Liza Womack for their support and research during the conception of this project. Very special thanks to Jane Christie of the Connecticut Humanities Council for her patience and advice. To all of them I owe the best of these materials. Still, the problems that could remain embedded in these pages are not theirs but my own.

INTRODUCTION

These Theme Studies are for enrichment of current programs. They can be used in Spanish language courses as well as in most other areas to supplement what is already taught. Their story-like format provides multiple opportunities for explorations in any number of directions. Teachers can use them as well for their own enrichment first.

The Studies provide narratives about selected topics of cultural importance in the Hispanic world from the pre-Columbian past till after the Conquest. They are divided into short units, each followed by suggestions for further explorations. A bibliography will help the teacher obtain additional materials for more in-depth coverage.

Rather than collections of facts, the themes are arranged as explorations. They are told as stories so that history appears like an adventure with a certain logic which the students can uncover and form opinions about. The goal has been to convey the ambivalence and uncertainty of historical motives. Guided by the teacher, students will employ critical thinking when viewing history, and will draw valuable lessons that are relevant to their experience. The studies should convey a sense of history as something alive and changing. We continualy re-evaluate the past in light of changed perspectives and new information.

I should stress that these studies are not meant to be a complete history of the topics covered. The bibliography should be consulted for more information. Teachers may encourage interested students to seek out further information on their own by using local libraries, museums, bookstores, or by seeking out people who might have information. Students will become aware of the varying quality of information available. They can begin to form an opinion about the quality of sources, and become better active learners.

For most effective use, teachers should read the studies first, ahead of the school year, and decide what parts to use. Teachers should decide if they want to read to their students directly from the Theme Studies, or paraphrase sections. Teachers should feel free to use only what they want, add materials, integrate topics with other subjects. These studies should be used to stimulate exploration and creativity while providing a basis for multicultural understanding. Then they will leave a lasting impression in the students, which will facilitate their subsequent related education.

1. THE BABEL BOOKSTORE

The Babel Bookstore is a shop in Montevideo, the beautiful capital city of Uruguay. It is owned and operated by Julio Marquez.

This unusual bookstore happens to be only a few blocks away from the Rio de la Plata, which in Spanish means the river of silver. Yes, the river shines silver under the sun, but like most other rivers, its waters are actually quite murky. It carries silt lifted from its bed, from all the way north in Argentina, Paraguay and Brazil. Some of its waters even come from the largest waterfall in the Americas, the Iguazu falls.

You see, this river of silver brings earth from the north, suspended in its current, earth from the tropical jungles. Some say it even carries stories, and if you listen very carefully you might be able to hear one or two.

Well, when he was a young boy, Julio Marquez tried to hear these stories. And so did his father before him, Carlos Marquez, as well as his grandfather, Martin Marquez, who used to spend hours by the river listening, waiting for something to happen. Not much happened. Just a few jellyfish floated by now and then. Occasionally dolphins played in the distance, near the changing boundary where the clear Atlantic ocean mixes with cloudy river water and makes it disappear.

Yes, nothing ever happened, thought Matin Marquez almost a century ago, watching the river of silver flow. So he gave up and did the next best thing to trying to hear the stories rivers tell. He got a storybook from the library and read it. Many, many more followed.

Some say books were invented when people became so busy they had little time left to sit and hear rivers, trees, animals, wind and rain tell their stories. They would much rather read all this from those who still had the patience to listen and write down what they heard. Others say books were invented just so those stories would not be forgotten, because stories do change. And that is also how history was created, when our ancestors invented writing, which happened at around 5,500 B.C., give or take a few hundred years. Before that time was what we call pre-history. Back then, in pre-history, people had to remember tales and tell them over and over again so they would not be forgotten. It was really quite nice. People would gather

to hear these stories told over and over again. When books were created, people began to sit alone to read. That is very nice too.

Now once a story is written down it is never forgotten for as long as the book is treated with care. In the olden days, books used to be called manuscripts. They were written by hand, often in scrolls and codices. They were hand copied and translated to many languages. And very few people could read or write. So, because of their special knowledge they had a lot of power and influence over others.

Manuscripts were kept in libraries like valued treasures. Let me tell you what happened to a library at Alexandria in Egypt, many, many years ago. You see, someone had the wonderful idea back then to create a universal library. The idea was to put in one single library all the manuscripts that existed in the world, to gather in one place all the power those manuscripts carried with them, all the knowledge they contained. It was a fantastic idea, and it was done. The place became known as the library of Alexandria, and it was one of the wonders of the ancient world, over 2,000 years ago. Manuscripts were obtained from all over the world. They were copied, stored, and translated into anciet Greek, which back then was the most important language of the region around the Mediterranean sea.

Unfortunately, the library of Alexandria burned down and nothing remains of it. We don't know why it burned. We don't know who did it or why. We don't even know exactly when it happened, not even where in Alexandria was the library. Archeologists are still searching for answers to this mystery. It seems that many manuscripts once housed in the library were taken out and saved before they burned. People are still trying to find any remaining manuscripts that may have survived the burning of the library of Alexandria. Such a shame. It was the greatest library that ever existed because it came closest to containing all the knowledge of its time and becoming, as some would say, universal.

The library that Martín Marquez visited at the begining of the century in Uruguay, had far fewer books than the legendary library of Alexandria. There were even fewer books he could read since he was quite young for most of what was there. Soon he finished all the storybooks and had nothing else to read. He did not have any money to buy the new books but he could afford a few used ones now and then which he bought at those musty, dark old shops filled with shelf after shelf of dusty books, each one a little

surprise all by itself there, waiting for someone like him to bring them back to life, to that life that books enjoy when they are picked up and read.

One day, young Marquez decided he would open a bookstore of his own. That way he could read all the books he wanted, and also sell them to make a living. He thought it was a wonderful idea. Fortunately young Marquez was someone with a lot of patience. He never gave up till he finished what he started when he thought it was a good idea. This one certainly was. So he borrowed money from people who liked his idea. With this money he bought books, and as he sold them for a profit, he was able to pay back the loans little by little. Many years later he bought an old building to house the growing store, and that is how the Babel Bookstore was created at the very start of the twentieth century. Young Marquez thought Babel was the right name for his bookstore because of something that happened to him, and it had to do with a very special book he found called The Lost Treasure of El Dorado. As you will see, this book changed his life forever.

EXPLORATIONS FOR THE BABEL BOOKSTORE

1 - Countries of southern South America: Argentina, Uruguay, Paraguay, Brazil, and Chile. Geographic locations shown on wall map.

2 - Geographic features. Show the Rio de la Plata, the river with the lagest estuary. Follow upstream on the map the rivers Uruguay, and Parana which branches into the Paraguay. Follow the Parana to the Iguazu and the Iguazu falls. Indicate the falls are in a tropical jungle.

3 - Show Alexandria on a map, as well as Greece. Use a historical maps to show boundaries and civilizations of the times.

4 - Narrate the biblical story of Babel and how according to it languages came about. Have students say what they think of this version. Have them come up with other ideas about how languages were born. Imagine why Martín Marquez named his bookstore Babel.

5- Explore how Martín Marquez got his bookstore started. How to make a business plan, obtain a loan, and pay it back. Show that things can go wrong. Explain why Marquez had to be patient. Talk about the value of persistence. Have students design their own enterprises. Have them state their product, market for the product, its value, financing, and other factors related to the business.
Explore further the notion of commerce. Long ago, commerce was based on barter. In our world we have currencies and division of labor. Show how far we have moved away from individual self-sufficiency. Show what has been gained and what has been lost.

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2. AT SEA

"Uncle Julio, you promised," insisted Sophie with a voice as firm as the fourteen year old girl could muster. "You said you would tell me today about how grandpa Martín found the treasure of El Dorado. I waited all morning already, and I did help you stack books, didn't I?"

"It's a long story, Sophie." Julio Marquez pretended to have little interest, but in fact he only waited for just the right moment when his niece would really like to hear the tale, and he would be in the best mood to tell it. Don Julio thought the moment had arrived. "Do your parents tell you long stories at home?"

"Once in a while," she nodded.

"That's very good, very good." He finished placing on a shelf the pile of books that had been left on his crowded desk, then he turned to face Sophie. "You see, when your grandfather Don Martín was just about your age, his imagination already carried him to far away places he could not ever dream reaching. His parents worked hard and long, running a grocery store and had little time to pay much attention to the things he wanted to do. So young Martín spent much of his time after school at the library where he read all the adventure books he could find. But that wasn't enough." Julio Marquez sat on the armchair by his solid oak desk. He leaned back slightly as if weighed down by the memories that rushed back to him.

"So what did he do?" Sophie sat on a high stool across the desk.

"He began to visit shops like this one, where he could get books for cheap. He could not afford much else. One day, in a small used books shop, he found something quite unusual and decided to take it home right away. It was an old, worn book entitled THE LOST TREASURE OF EL DORADO. Not only did the book capture his imagination about searching for lost treasures, it actually contained a map to the treasure itself. It did not take long for Martín to decide the map was genuine and that the enormous treasure of El Dorado laid under the X indicated on the map, waiting for him. But first he had to cross the vast Rio de la Plata."

"Daniel's grandfather worked at a small shipyard. He was an excellent carpenter. His wife was a seamstress, and she made wonders with cloth, anything from dresses to sails for the small boats her husband built. From a very young age, Martín learned to sail. Now he had his own sloop, not much

bigger than a rowboat, but enough to navigate the Rio de La Plata from dawn to dusk, entirely on his own. Actually, on sunny days, the sloop was his favorite place to read."

Don Julio told Sophie how Martín Marquez finally made up his mind to leave on this boat in search of the lost treasure of El Dorado. He packed his knapsack with a change of clothes, a heavy blanket, food to last him for a few days, the book, and a small compass. He filled his canteen, put on his best walking boots, and sailed away one bright morning, headed due south, toward a point on the shore of Argentina just north of Mar del Plata. This would be his longest voyage yet by sail boat, but he felt quite confident in his ability to navigate, and face whatever dangers he might have to face. He was a strong swimmer, and he thought that was enough.

As he sailed away, people at the harbor gradually vanished in the landscape of the city, absorbed by larger shapes of trees and buildings. Then the entire city of Montevideo seemed to sink slowly into the sea. An hour later, only the very top of the tallest buildings were visible above sea level. Then they also vanished as if they were the masts of a sinking ship. Now Martín found himself alone in the vastness of a river as wide as a sea.

By noon he noticed the water began to change color, from the brown of silt, to clear light green. He scooped a handful and tasted it. Yes, the water was no longer fresh but salty. He had reached the Atlantic.

He saw toninas nearby. That's the local name for porpoises. These are very shy and gentle. They move in groups of up to eight and surface almost without disturbing the water. So they are difficult to sight. But further out at sea he encountered bottlenose dolphins. He recognized then from drawings his father made to describe this playful animal. These dolphins were not shy at all. At least two dozens of them circled the boat as if it was some sort of funny toy. Then they began to leap in the air, diving close to the sail boat and splashing all over. Martín was getting very wet and began to lose patience, especially since he could not read his book about El Dorado. It risked getting soaked. He had to wrap it again in paper and oilcloth and put it away.

The dolphins did not tire of playing. They had not seen before such a small boat so far away at sea. And the boat looked very friendly with its triangular white and blue sail, and also that hairy creature that certainly looked too dry and perhaps wanted to get back in the water. Instead, to the dolphins' surprise, the creature took an oar and tried to hit them on the

head, but of course hit only water. The creature looked helpless and upset. Perhaps it was too lonely.

Oar in hand, Martin struck down on the water to keep the dolphins away. He wanted to stay dry. He also wanted to read the book in peace. "Get out of here you dolphins," he shouted. "You're getting me all wet, you stub nosed rascals. Out with you!" And he struck the water again. Finally the dolphins swam away. He felt very pleased.

Although Martin kept on course with fair wind, he miscalculated the boat's speed as well as the distance he had to travel to reach his destination. By nightfall he was still away at sea. He had just caught a glimpse of the other shore, so he set the course and kept on sailing in the dark, hoping a change of wind or currents would not change his direction. He would not know till sunrise.

Sailing in the night was far worse than Martin thought. Clouds rushed in. Not only he could not see where he was going, but the wind picked up and began to blow furiously. Soon, his sloop was tossed about by the waves like a tiny paper boat. He had to lower and secure the sail or it would make the sloop capsize. In pitch darkness, he found himself at the mercy of a violent storm. Martin packed his book in the knapsack which he then strapped to his back. He was scared. He did not calm down to think that if he fell in the water, the weight on his back would make him drown quickly, no matter how strong of a swimmer he was.

Only two hours before daybreak, the tattered boat faced its last wave, which hit it broadside like a wall of water and swallowed the sloop in one explosive gulp. Martin was tossed into the sea. He managed to hold on to a lifesaver, but the furious storm sapped his strength. He lost grip and began to sink.

Martin thought this was the end. Just then he felt shapes press his sides and lift him up to the surface. He reached with his hands and realized the dolphins were back to help him. And help him they did, carrying Martin on their back all the way to shore.

As the sun rose from the Atlantic ocean, the dolphins reached land. Martin stood on his feet, water up to his waist, and waved the dolphins goodbye, sorry that he had once chased them away, happy they did not take him too seriously and that despite his bad behavior, they still felt enough for him to save his life. He realized he had learned something from the dolphins as well as from the sea.

EXPLORATIONS FOR AT SEA

1 - Talk about boats and how they are made. Have students consult the local library for more information.

2 - Navigation. How to navigate at sea. The use of a compass. How to read a map. Activity: make a treasure map and have a group in the class find the treasure using the map. In New Haven, CT, teachers can contact Schooner, Inc. and the Sound School of the Public Schools for more resources on navigation and boats.

3 - Dolphins and porpoises. Bring books to school about these delightful mamals. Organize presentations.

4 - The world is round as suggested by the "sinking effect" which Martin notices as he leaves harbor and the city seems to sink into the sea. Demonstrate the effect on a globe. Give a history of the shapes of the world. Explore with children how one could tell if the earth is flat or round. Ask them to come up with ideas then discuss the ideas. Locally it seems flat, but the "sinking" effect does not agree with such theory. Discuss local versus global notions. Another element to consider: the lunar eclipses as the earth casts its shadow on the moon's surface. What causes the shadow and what does it tell us about the shape of that object? List the shapes that could cause such shadow, from a disc to a sphere. The ancient Greeks thought the earth had to be a sphere because they considered the sphere to be the most perfect shape. Another consideration: by analogy, could the earth be shaped like the moon? But why can't the moon be just a disk. Imagine how people who had no access to space travel made sense of these questions.

5 - El Dorado means "The Gilded One." See Incas page 97. Explain the origin of this myth based on a Chibcha Indian ceremony. Indicate that the conquest of the New World by the Spaniards was greatly motivated by the search for gold and treasures, some real, some mythical.

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3. THE DESERT

The map Martín had to follow did not allow shortcuts. It was not a geographical map drawn to scale, with a destination clearly marked so one could take different routes to reach it. No, this map was a sequence of instructions distributed vaguely on a folded paper over a drawn landscape which did not look like anything he could recognize. The map came with a small book which gave a wealth of instructions and made it easier to find the different locations. Martín soon realized the map was arranged in such a way that if he made a mistake, if he missed or skipped a step, he would never be able to find the next one.

"What a strange map," thought Martín as he walked away southwest from Miramar, headed for Patagonia. Only much later would he realize that the map had a hidden purpose beyond reaching a destination. This map was an adventure. Just like when we grow up we follow a set of steps, and we should not miss any of them, this map also took its user along a series of situations which, in retrospect, were as important as the destination, or perhaps even more important, as Martín would eventually find out. For now he moved on, greeted along the way by people that welcomed him, and gave him food and shelter so he could go on further and further away from civilization, beyond roads' end. From there on his compass and the map were his only guides.

At night, an occasional armadillo would come close to check him out. Human beings were rare in this part of the country, as rare as trees. For, you see, the map did not show that Patagonia is nearly a desert.

Martín would fall asleep looking at the stars. In the clear desert air they seemed to shine much brighter. He liked to watch the Southern Cross drift ever so slowly across the night sky. Of course, he could not actually see it move, but when he looked again at the Southern Cross, he could tell it had changed location. It takes a lot of patience to notice stars move. They all seem to go the same way, at the same speed. How could that be?--wondered Martín. How could so many stars flow together so well as if carried along a curved path by an invisible river, as if they were painted on an invisible sphere that rotated around the earth. Lying flat on his back, Martín opened his hands and placed them palms down on the dry gound. He could almost feel the earth move. What a beautiful discovery, he thought, when ancient astronomers realized it was far simpler to imagine the earth

move, rather than the stars. As the earth spins, the stars seem to go by along the night sky, just like the river banks go by along a moving boat. But it is not the landscape that moves. It is the boat. Still, it was hard to imagine something as huge as the earth actually move. It was actually even harder to imagine that the earth not only spins but it also orbits around the sun. And thinking of the wonderful mysteries of the cosmos, Martín gently drifted away into sleep, another marvelous little mystery.

Day after day, Martín moved deeper into northern Patagonia, always headed west as the map told him, toward the Andes range, the backbone of the American continent. One morning he was awakened by some sort of pecking on his ribs. He rolled over on his left side. Moments later the pecking resumed. Martín tried to chase away with his hand whatever tickled him. His hand soon hit a large, soft thing which now pinched his thumb. That woke him up right away.

He opened his eyes and found another pair of eyes staring down at him not in anger, but rather with curiosity. There was a beak, not a nose, between those eyes, and the rest of that tiny head was somewhat fluffy and rather bold on top. Martín realized his own thumb was caught in the beak. He yanked it out immediately. That head was attached to a long, thin neck, which in turn reached a body of feathers from which protruded two long, muscular legs. They reminded him of plucked turkey legs. But this beast was not a turkey. He recognized the animal from drawings in books. It was an enormous ñandú, the South American ostrich.

Martín remained calm. The ñandú could have his thumb back if it wanted. The big bird could do serious damage with one blow of those powerful legs that ended in three-toed feet, each toe armed with a long, sharp claw.

The ñandú lifted its head. It did not walk away. Martín and the bird remained at a standstill while presumably they tried to guess each other's intentions. Finally Martín decided to get up, very slowly so as not to startle the ostrich. The bird merely took a couple of steps back and continued to watch the newcomer with its large eyes in such a small head.

Martín realized they were not alone. Around them were at least twenty more ñanduses, all staring at him. What was he supposed to do? Perhaps if he began to walk. He put the knapsack on his back and took a few steps very slowly, then stopped. The birds did not move. He walked again, faster now, and headed toward an opening in the circle of birds. Now the

nandues opened up the circle and regrouped behind Martín who kept up the pace, heart pounding fast, ready to run at the slightest sign of danger. He had nowhere to go and hide, though. If they wanted, those ostriches could make mincemeat out of him in no time. They did not.

"Perhaps they are not hostile at all," thought Martín. He checked the compass to adjust his course and head due west according to the instructions in the treasure book.

Martín walked away. Soon he lost sight of the birds. He breathed more easily. The sun felt even warmer, bigger, heavier. Now he began to notice more numerous cracks in the scorched ground. Ahead there was only a yellowish mantle of sparse grass and dry earth.

Martín was about to speculate and venture some conclusion about his situation, when he felt the earth shake under him. He looked around and saw a small dust cloud at ground level, approaching from behind. The ñandues were coming back. Soon he was engulfed in dust as the birds sped by him wihout even stopping. Moments later, the ostriches turned around and headed back to where he was. He choked in dust once again.

"Hey you bulky birds," he shouted, "is this some sort of race?" The nandues ran by him again and left him coughing.

"Silly birds," he mumbled. He took the canteen and drank some water to clear his mouth and throat. With dismay he realized one last gulp of water was all he could get out of the canteen. That was all the water he had, not much at all. He had to find more water soon or else he could be in big trouble.

The ostriches sped by one more time. When the air cleared, Daniel's mouth was full of dust again. Then they returned and began to run in circles around Martín, lifting even more dust than before. The situation soon became intolerable. Martín didn't care anymore if the birds clawed him to shreds. He wanted them to stop running and making so much dust.

"Get out of here you rascals. I can't breathe!" He threw stones at them and chased them away.

When he woke up in the morning, Martín was dehydrated to the point he could hardly stand on his feet. He got up, walked a few yards, fell, got up again, walked, fell. He kept this up for a good part of the morning, till he could no more, and collapsed. He needed water. He had none.

The ostriches returned. They must have sensed something was not quite right with this strange animal, for they walked right up to Martín and lowered their long necks to get a closer look. Then they pushed him gently

with their beaks. He did not move. Martín opened his eyes. He tried to say something, but no sound came out of his dry, dusty throat. He stared only with glassy eyes, unable even to blink or cry.

Then one ñandú, the biggest one, got down next to Martín. It sat like a pet dog. Then it wound the neck around him and pushed him with the beak toward its own body. Martín was disconcerted. "What did it want with him?" Martín stared right into the eyes of the ostrich. The other birds looked on.

There was something kind in that animal's gaze, something warm and good, a sort of understanding he had never sensed before, as if the bird could feel his thirst and his agony. It continued to prod and push him towards its body. Martín thought he understood. Finding strength, he climbed on top of the ostrich and held on to its neck. The animal got up slowly on its long legs and turned its small head to look at Martín. Birds cannot smile, but Martín swore this one did, somehow, out of the corner of its beak.

The ñandú began to pick up speed little by little. The others filed behind. Soon Martín found himself bouncing across the desert at great speed. It was not a bad ride at all. The ostrich was smoother even than a horse at full gallop, and just as fast.

Martín managed to hold on to the ñandú. It ran for several hours without a break, until before dusk they reached a creek. He climbed down and fell in the cool, clear water. The water tasted like honey and cream. He thought he could drink the entire creek all by himself, but of course he shared the water with his new friends that had just saved his life. They all drank till they could drink no more. Then, as night descended, the time came to say goodbye.

"What could I ever do to return this favor?" Martín asked. Of course the ñanduses were unable to answer that question in any way that he could understand. The big birds turned around and ran back to the desert. Martín looked at the mountains that rose to the west, at the edge of the desert, oulined against the sunset. They seemed to be the ones indicated in the treasure book. Tomorrow he would resume the journey.

EXPLORATIONS FOR THE DESERT

1 - The stars of the southern hemisphere, particularly the southern cross. Indicate how to locate the south. Contact the nearest observatory or astronomy department of a college or university to get more information, as well as the local library.

2 - Life in deserts. How animals and insects manage to eat and drink. How life is adapted to the weather. Study camels. How to survive in the desert. The symptoms of dehydration.

3 - Research further about the nandu and the armadillo.

4. THE LOST TREASURE OF EL DORADO

As he neared the Andes range, the desert gave way to forests which grew increasingly dense. He had heard of this before. Along the southern part of the Andes, the prevailing easterly winds bring moisture from the Pacific ocean. This moisture condenses when the air cools as it gains altitude. It rains and snows a lot on those mountains which mark the border between Chile and Argentina. But after the wind crosses the border which runs along the highest peaks of the Andes, and enters Argentina, it turns drier. That is why the Patagonia is so arid.

At the end of a valley, on top of a grassy hill, stood a modest log cabin quite visible from as far away as he was. It was not a mirage at all. Someone lived after all in this remote corner. He reached the cabin a couple of hours later. He was surprised to see how well kept it was. He knockeD at the door. There was no answer. He knocked again.

A sea of flowers scattered meticulously on the slopes near the house. There were planters at the windows, blooming with colors. A vegetable garden appeared well tended and full of ripe produce ready to be picked.

"What tomatoes!" he marvelled. Driven by hunger, he ate one in three bites. As he got ready to devour another tomato, the nearest he could find, a sudden call startled him.

"Not that one. It's not ripe."

Martín turned in the direction of the voice uncertain of what he would find, but no one who tended a garden so well, he thought, could be bad at all.

There stood a thin, tall man with white strands in his hair and beard. He had a kind but penetrating gaze which seemed to reach down to the bottom of Daniel's heart. He picked a tomato and handed it to him.

"You can call me Don Nicolás," he said.

"Martín is my name."

"You are going to Cerro Tronador (mountain of thunder), aren't you?"

"Yes. How did you know?" replied Martín.

"What else would bring you here except the mountain? Certainly not me" replied Don Nicolás with a broad friendly smile.

"Where is it?" he asked.

"Come. Look," said Don Nicolás, and he led Martín to the top of the grassy hill. Suddenly Mount Tronador appeared right in front of them, so

close Martín felt as if he could touch it if he leaned out far enough. It was only an illusion. The mountain was about a mile away, calm, majestic. According to his book, an enormous treasure was concealed somewhere there.

"This is a wonderful mountain," said Don Nicolás. "Like all marvelous things it has to be treated with love and respect, or else it could turn against you with all its might, and a lot of might that is."

Martín paid close attention to the words of the old man. He sensed his very future depended on it.

"High on the mountain, beware of the white wind. When it begins to blow there is only one thing to do. You must run for your life. Go down the mountain immediately. Seek shelter in the woods below. You see, Martín, the cold white wind rushes in suddenly with the roar of a thousand locomotives and crashes against the mountain. Up on the snow fields, the white wind is a deadly trap. It never gives up a victim."

Martín was not intimidated. He thanked the hermit for the advice and left.

The book THE LOST TREASURE OF EL DORADO gave no more directions. It had guided Martín to the mountain where the treasure lay hidden. Now it was up to him to find it. The book concluded here with a curious warning. Once found, the treasure had to be taken out into the light or else it would be lost forever.

The spring thaw had created torrents that roared down the mountain. White water gushed through rocks, jumped out over ledges and fell from enormous height, turned to waterfalls and rainbows.

Finally, by early morning of the second day on Cerro Tronador, Martín reached the edge of the snow fields which extended all the way out to the summit. Towers of rock emerged through the snow to form a formidable fortress with streaks of snow in between. At the bottom of the cliffs, the compacted snow had turned to ice. These fields were dangerous, Don Nicolás had told him. Fresh snow covers deep cracks in the ice. It is so easy to fall into a crevasse, and be swallowed forever by the mountain.

Martín had not been on the snow field for more than an hour when he heard a loud rumbling coming from above. As he looked up he saw an enormous chunk of snow break loose from a ridge very high above him. With a thunderous roar it crashed and sped down the slope. He felt the gush of wind created by the avalanche as it rumbled down the slope not far from

where he was.

Days of search followed. The weather remained clear and comfortable. Some nights he was able to sleep in caves up past the snow fields without having to return to the woods for protection. Early the third day he found traces of an ancient path.

"Who else but the Incas would have opened a trail this high up the mountain?" thought Martín. "How else would hundreds of llamas come up these steep slopes?" His heart began to pound. "This is it," he said to himself, "this has to be the way." He followed the trail up, or rather, he followed what was left of it, spared by avalanches and erosion. Enough survived the centuries to show the way.

At one point, the trail disappeared, pushed away by a glacier that descended from the cold heights of cerro Tronador.

It did not take Martín long to find the trail again on the other side of the glacier. But the trail did not go very far. It suddenly ended at a large, flat slab of rock about forty feet high and no more than five feet thick. It laid almost vertically against the side of the mountain. The rock seemed to be supported by a small ledge at the bottom. Below was a precipice.

"There could be a cave behind," thought Martín. "The Incas probably used the rock to hide the entrance to the treasure."

Martín examined the large rock. That is when he noticed a birds' nest on top of the slab, and high up in the sky he now saw a very large bird circling and circling. It was a condor. From inside the nest he heard a very faint chirping. There were chicks in the nest. They had to be baby condors.

Martín tried to see better behind the rock. Something glittered in there. "My goodness!" he exclaimed. "It looks like gold!" He stretched his arm through a small opening, as far as he could. He touched an object and pulled it out. It was a gold figurine that looked like a toy llama.

"The treasure!" he yelled beyond himself. "I found the treasure! I'm going to be rich, so rich!"

Martín hurried to wedge rocks into the space between the slab and mountain wall. Then with another stone he began to hammer them in. The huge rock that stood between him and the treasure would soon fall.

When Martín paused to catch his breath, he heard the baby condors again. They peeped from the top of the rock, helpless. He realized they would be killed when the rock fell down the precipice.

"I have to get to that nest," Martín muttered in anger. He started to climb again. "Why in the world did they build a nest right here?" He held

desperately to whatever handholds and footholds he could find. But the rock was too smooth, too vertical, he slipped, and still trying to hold on he slid down. He kicked the mountain in anger. That hurt. He had to make a choice right now: save the treasure or save the birds.

Martín sat down on the ledge. His feet hung down in the void. How could he avoid killing the baby condors? Perhaps he could go down, get a rope from Don Nicolás and use it to rescue the birds, then dump the rock, and get the treasure. But the book clearly warned that if he left the treasure, it would disappear.Why not give it a try? The treasure couldn't go anywhere by itself just overnight. He decided to take the chance. So he said goodbye to the birds and the treasure.

"Don't you go anywhere, you hear," he yelled as he began to run down the mountain. "I'll be back. Stay right there."

Martín felt a chill in the air. The sky had become overcast. Clouds crashed against the top of cerro Tronador.

He headed down a narrow field of snow, pressed between two cliffs. Now the clouds were even lower and cut down the visibility, he slid down the snow into a fog of thin ice flakes pushed by a wind that suddenly, without warning, reached the strength of a hurricane.

"This must be the white wind," gasped Martín as he managed to stop sliding. He realized he stopped within inches of a precipice. That snow field led nowhere. He crawled to the left only to find a cliff. Then he crossed to the right. Another cliff, just as steep, blocked the way. He had to go back up to find a way out. He tried to climb up the snow. It was so cold. His hands and feet were numb already and the snow field made it even worse. He had to get out of there.

Martín crawled back to the cliffs on the right and found some shelter on a ledge. At least he managed to take out of his knapsack a woolen hat, mittens, socks, and another sweater to put under the windbreaker. He felt a little better. He stuffed his feet inside the knapsack and huddled himself against the rock.

The white wind beat down against him with full force. It had become unbearably cold despite the extra clothing he had on. Martín felt numb again, all over. He felt sleepy from the cold. Unless he sheltered himself better, he would not survive the storm. But he could not escape. He had nowhere to hide. Martín huddled even more. His body was now covered with snow.

"Nothing can save me from this one." He cried. He was afraid. He wanted to be back home. He could not.

As he was about to slumber into an icy sleep, Martín saw three enormous shapes come straight out to him from the storm. They were three giant condors. They opened their dark wings and huddled him.

Martín fell asleep wrapped in feathers. This is how he made it through the storm and escaped against all odds the deadly grip of the white wind. Three condors saved his life.

He woke up to see the condors fly away.

"Goodbye," he mumbled to them, "and thank you."

The storm was gone. Now a bright morning sunshine washed the face of cerro Tronador. He must have slept through the night.

Martín felt hungry and tired, but most of all happy to be alive. He returned the next day with a rope, and found the rock again. But the nest of condors was gone, and when he looked inside, the treasure was gone too. He was not all that surprised. Although he had lost something, Martín realized he had gained something too. The little gold llama he had in his pocket would be his souvenir of this adventure.

Don Nicolás enjoyed hearing Daniel's story. He seemed to know it had to end this way. "You got your treasure," he said. "The best one you could ever have. And it will be yours for as long as you live. No one can take it away from you."

The hermit invited Martín to stay with him for a few days.

EXPLORATIONS FOR THE LOST TREASURE OF EL DORADO

1 - Mountain climbing. The changing weather on mountains (Mt. Washington, for example). Explain how weather changes when the mountains push up and down masses of air. Glaciers. Study the flora and fauna of mountains at different altitudes.

2 - Make treasure maps and follow them. What makes something a treasure? When Spaniards encountered American natives, they traded items of little European value, like glass-bead necklaces, for gold. Both sides thought they got a terrific deal in the exchange. Why?

3 - Project on the condor--an endangered species.

5. REAL TREASURES

Don Nicolás enjoyed hearing Martín's story. He was not surprised. It had all happened before and it would happen again. The book called THE LOST TREASURE OF EL DORADO was lost once more, somewhere on Cerro Tronador, according to Martín, as was the treasure itself.

"Don't worry about the book." Don Nicolás smiled amused. "It will find its way to someone else. Books come and go, just like that. They really can't be owned."

Martín showed the small gold figurine of a llama that he still kept in his pocket, and the old man's face lit up immediately. "Oh, but you did get your treasure."

"Just this." Martín shrugged his shoulders.

"More than enough." Don Nicolás began to laugh. He stirred a pot of stew he had been cooking since before Martín returned. "This is the real treasure." He tasted with delight his concoction. "Not just the real treasure of the Incas, but that of all native americans: potatoes, corn, yams, tomatoes, beans, some pumpkin and squash, with a touch of chile pepper."

Here, Julio Marquez explained to Sophie that the native americans had contributed many food crops totally unknown in Europe. Nowadays, potatoes and corn are two of the four largest crops in the world (the other two are wheat and rice). Other foods are manioc, from which tapioca is made, peanuts, papaya, avocado, guava, pineapple, cocoa, chewing gums such as chicle (obtained from the milky juice of the Sapodilla--a tall tropical evergreen) (However they also contributed tobacco and coca). More than gold and other riches, these food crops became the first real treasure to come out of the Americas.

"Unfortunately," said Don Nicolás with a sad voice, "what the Europeans first brought to the Americas were diseases the natives had never suffered before, especially smallpox. Native Americans had lived in isolation, whereas the Europeans had already been exposed to illnesses from all over the Old World. The epidemics brought on by the Europeans

devastated the native populations, killing people by the millions. As many as one in three died of illness. So you see, the most devastating weapon the Europeans had, unknowingly, was a biological one. They brought deadly plagues to which they were mostly immune. The natives simply could not defend themselves."

Don Nicolás took the tiny golden animal from Daniel's hand and gazed at it for a moment. "Ah, the llama," he exclaimed. "The Incas built their vast empire with the help of llamas." He told Martín the Inca empire was 4,000 kilometers long. A network of 16,000 kilometers of highways connected their land, some almost 8 meters wide. At the center of this long road system was Cuzco, the capital of the Inca empire. Four highways reached the city. Don Nicolás explained that the Inca roads were comparable to those the Romans built, the "vias." But the Inca roads had to overcome enormous obstacles. They were built on the Andes, mostly along crests or carved our of the flanks of mountains. They had to cross mighty rivers that thundered down deep gorges, like the Apurimac over which they constructed a fiber-rope suspension bridge. These roads were marvels of engineering and determination.

"Right here," indicated Don Nicolás, "at the Cerro Tronador is where their last southern highway ended. It was thought that the Inca highways did not go past the cerro Aconcagua (the highest mountain in the Americas). Few traces remain of this stretch which went beyond the Maule river. South of this river lived the fierce Araucanos, and the Incas chose not to challenge them. The Tronador is as far south as they went."

Don Nicolás explained that when the conquistadores led by Francisco Pizarro began to invade the Inca empire from the north, from Quito and Cajamarca down to Cuzco, a vast portion of the Inca treasure was secretly moved to the hidden city of Machu Picchu, built high on top of a mountain, invisible from the valleys below. From there it was transported two thousand miles south on llamas, and burried in the Cerro Tronador. The Spaniards heard rumors of this. They called the treasure of El Dorado.

Julio Marquez told Sophie that El Dorado was the wrong name for this treasure, since the name refers to a Chibcha Indian tradition, and this tribe lived in Colombia, north of the Inca empire. According to the myth of El Dorado, each new ruler of the Chibchas had his body covered with gold dust and plunged into lake Guatavita in Colombia. The new king washed his body

and offered the gold dust to the gods.

"But one Spaniard," said Don Nicolás, "one daring Spaniard called Diego de Almagro, left Cuzco and headed south with 570 soldiers and 12,000 natives to explore what was called the 'land of Chile.' He hoped it glittered with gold. After a year and a half, Almagro returned disappointed. He failed to find the right way. Instead he wandered along the deserts of northern Chile, the inhospitable mountain ranges, and the Argentine salt flats. He did not push far enough south. He gave up too soon. Too bad for him. Eh?"

Don Nicolás invited Martín to sit down and eat. He did not have to ask twice. Martín was starved.

Martín Marquez returned home with the precious memory of his adventure fresh in his mind: the dolphins, the nanduses, the condors, the beautiful mountains, the mysterious treasure, and the words of Don Nicolás. But most of all he was amazed it all had happened thanks to a book. From then on he decided to search for valuable books and open his own bookstore where he would sell and trade the books he found so he could go out all over the world and find some more. He named the bookstore Babel.

Sophie asked her uncle why the bookstore was named Babel.

"Oh, perhaps he liked the sound of the name. Or maybe he had the legend of Babel in mind. Babel was a city in ancient Babylonia, what we now call Mesopotamia, in Iraq. There Noah's descendants began to build a huge tower to reach heaven. But God did not like the idea of men coming close to him using their own means, so he prevented them from finishing the tower by causing them to speak in different languages. The builders left in confusion and spread the various languages acrosss the world. A glorious moment that was. This bookstore was to be a modest new Babel."

EXPLORATIONS FOR REAL TREASURES

1 - The metric system.

2 - Explore why it is better to have a wide variety of food crops rather than just a few, as well as variety within each type of crop. Some resist better than others various types of diseases, soil conditions, sudden weather changes, and so on. Diversity gives more flexibility in a changing environment. Actually, the continuation of life on earth depends on diversity.

3 - Explore the value of cultural, ethnic, linguistic diversity. This is an open question. However, it is hoped that these theme studies will contribute to the understanding that diversity is a most valuable treasure.

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6. GEOGRAPHIES

(Note: because of its complexity, this section
is mostly suitable for 5th and 6th graders)

One morning Don Julio and Sophie catalogued a shipment of books that had just arrived.

"Tell me Sophie," he asked. "What would you like to be? A profession I mean. Have you given any thought to that?"

"Yes I have," replied Sophie immediately, quite sure of her words. "I'd like to be an astronaut and go to Mars."

"Mars? Do you think you'd find any old books up there?"

"There are no books on Mars, uncle Julio," exclaimed Sophie.

"Well, perhaps not. But soon there will be." Don Julio laughed. "That's very good Sophie: an astronaut on Mars. You will have to know where you're going. Won't you?"

"Sure I will." Sophie thought that was a silly thing to say.

"If I look at night at the sky, I would not be able to find Mars. How would you know?"

"Come on uncle! You have to use telescopes to establish the trajectory of the planet, computers to calculate the course of the spaceship. All sorts of things. It's very complicated."

"I wonder what it would be like to live on Mars." Don Julio paused to ponder. Sophie knew that in moments like this it was best to let him think. "Well, I don't know, but I'm sure navigators in the olden days had as much difficulty finding their way at sea as modern astronauts have out in space." Don Julio paused again. "And what if you end up in the wrong place? You know, it's happened before. Let me tell you about one of the biggest and luckiest mistakes ever made, and it had to do with books too."

"Imagine you lived in ancient Greece, say about 200 years B.C. Imagine your name was Erathostenes. A nice name, eh?"

Sophie smiled. "That's a long name, uncle Julio."

"Nice and long, yes. Now imagine you wanted to know the size of the Earth. How would you do it?"

Sophie was dumfounded. She could not figure out how anyone could measure the circumference without airplanes or satelites. But Erathostenes

did it using no more than a measuring stick plus a very good estimate of the distance between two cities in Egypt: Alexandria and Syene (now Aswan). He also used some very ingenious reasoning, and the ancient Greeks were masters at that.

First of all he assumed the Earth was round. Many people thought it was actually flat, and that if one traveled too far one would fall off the edge. But thinkers had seen what happened to ship when they sailed past the horizon. They seemed to sink gradually into the sea till the last trace of the ship would be the top of a mast, and that would vanish too. When the ships returned to port they told that nothing unusual happened to them. It was actually the shore that seemed to sink in the water. To Erathostenes and other thinkers this meant, obviously, that the surface of the Earth was curved, not flat. And immediately they thought of a ball, a sphere, that which the Greeks considered to be the most perfect shape.

There was further evidence of the curvature of the Earth. The moon looked round, but it could be a disk. And on a crescent moon, the dark part has a curved edge. The dark part had to be the shadow of the Earth blocking the sun, and that shadow had a rounded edge. The Earth had to be round. But it could also be a disk. Only the fact that ships departing in any direction always encountered the "sinking" effect meant that the Earth had to be round in all directions, not just in one. It had to be a sphere. It was indeed a brilliant assumption, and well supported by observation. This is the way scientists work: observing, thinking, calculating, using known information, coming up with ideas or theories, and allowing others to check these ideas (theories) by repeating observations or by doing experiments. That's how we learn new things.

So Erathostenes was sure the Earth was round. He now wanted to calculate its circumference, but of course he could not travel all around the Earth to measure it.

He knew a few other things: sun rays that reach the Earth are parallel (nearly so: explain why). This was a very important bit of information: if sunlight fell vertically in one spot and produced no shadow, at the same time in a point far away it would leave a shadow. By using a stick of known length, and measuring its shadow one can calculate the angle of the vertical and sunrays (perform this experiment).

Erathostenes had also heard of a very deep well in Syene where once a year the sun cast no shadow inside (explain that meant the well was at a tropic and the day the sun cast no shadow was the summer solstice. Why

this was a remarkable well had to do with the fact that Greeks lived north of the tropic, so the sun always cast shadows in wells. The sun never came to be directly overhead. In between the tropics, wells have no shadow twice a year. Over the Equator this happens in between solstices.)

How Erathostenes came to estimate the size of the Earth was quite simple once he had this information, and also once he managed to estimate the distance between Syene and another far away point due north. He chose Alexandria. From travelers he knew that camels took 50 days to go from one city to another, and he also knew the average distance camels traveled in one day. That's how he calculated the distance between these two cities. The very that that the well at Syene cast no shadow, he measured the shadow of a stick at Alexandria. Using this data, a very simple calculation gave him the size of the Earth, its circumference (do this calculation in class using mock data). His estimate was roughly 28,700 miles, only 15% too high--a most remarkable achievement.

Years later, an Egyptian Greek named Claudius Ptolemy, a geographer and astronomer who lived in Alexandria, set out to write a book known as Geography. In it he included all what was known about the world at the time. When he came to write about the size of the Earth, he changed Erathostenes' estimate of the distance between Alexandria and Syene and made it much shorter. According to his calculation, the Earth was only 18,000 miles around, a big mistake of over 37%.

With the downfall of Alexandria and the vanishing of its monumental library, all that knowledge was lost. But many centuries later, a monk named Paslla Strozzi found in an old bookshop in Constantinople Ptolemy's Geography. Immediately that became the source of geographical information. Erathostenes' far superior calculation was forgotten. Ptolemy's figure for the size of the Earth became the erroneous standard, and this error led to one crucial miscalculation by a navigator know as Cristobal Colon, born Cristoforo Colombo in Genoa, Italy. Errors, at times, can be very fortunate.

"Imagine," said Don Julio. "Just imagine the distance to Mars you think is correct is really way too short. Then off you go, and after traveling the distance you planned, you land on a planet. Mars! you think. But Mars is really much farther away. Instead you landed on a planet you did not know existed, and you are convinced it is Mars. That's more or less what happened to Columbus here on Earth. And all because of a forgotten book that a monk found in an old bookshop."

"What did Ptolemy's mistake have to do with the voyage of Columbus?" asked Sophie.

"A lot. You see, thanks to that mistake he managed to get the backing of Spain to undertake his voyage. But first I have to tell you about Marco Polo and the riches of the Orient."

"From the Orient came spices and silk which were luxury items in Europe." Don Julio explained that among the spices, clove was particularly sought after since it was believed to protect from the deadly bubonic plague that was ravaging Europe. (In reality cloves offered no protection from the disease.) The cost of these items was very high because the products changed hands many times along the seven thousand miles long "silk route," and the price rose with every transactions.

Marco Polo traveled with his father and uncle along the merchants' route all the way to China, and met the Kublai Khan, the Mongol ruler of Asia. They left in 1271 and returned twenty-four years later to Venice, from where they had left. Marco Polo's diary of the trip became a precious source of information for Europeans. It gave the first account of these remote lands, entirely unknown to Westeners till then. It also stimulated the desire to establish closer ties with Asia.

Don Julio walked over to a bookshelf and tool a worn volume which he handed over to Sophie. It was a copy of The Travels of Marco Polo, the diaries of this extraordinary journey. "Here," he said, "you can read first hand about this incredible trip."

Julio Marquez told Sophie how Portugal, a seafaring nation, wanted to open a direct route to the Indies and China, and so deal directly with the producers of silk and spices. Their strategy was simple, in principle. Go south along the western shore of Africa and discover a passage to the East. Ptolemy's map did not show such a passage. Instead, he drew only land at the bottom of Africa and he called it "terra incognita." The Portuguese pushed ahead, and finally, in 1488, one Portuguese navigator, Bartholomeu Dias, managed to round the Cape of Good Hope, and prove that it was possible to sail around Africa to the East. Columbus was in Lisbon when Dias returned. Columbus was disappointed by the success of Dias' expedition because he realized that now he would not be able to get the support of Portugal for his trip Westward to the Indies. The Portuguese now had their own route, which was soon to be opened by Vasco da Gama in his epic journey to India and

back from 1497 to 1499.

Columbus went to Spain to get support. After much negotiations, he managed to get funding from Ferdinand and Isabella, the king and queen of a reunified Spain who now wished to expand its influence. Citing Ptolemy, he claimed that sailing a short distance due West he could reach Asia much faster than the Portuguese who chose to round Africa. Columbus cited Marco Polo as well, who indicated that Asia extended further East, and that there existed a rich island called Cipangu (Japan). This would make the trip even shorter.

Ferdinand and Isabella were hesitant. Scholars thought Columbus understimated the distance he would have to travel to reach Asia. He also wanted too much. For his services he wished to receive ten percent of all revenues, plus be appointed grand admiral and viceroy of the lands he came across. These titles were to remain in his family. At first he was turned down. But soon, because of rivalry with Portugal, the King and Queen called him back and agreed to all his terms.

"Columbus was granted the support to sail," indicated Don Julio. "He was a lucky as well as very happy man. But not for long."

EXPLORATIONS FOR GEOGRAPHIES

1 - Have students repeat Erathostenes' measurement, following his logic but using other locations. Compare results with the known circumference of the Earth. Two points far apart in latitude could be in telephone contact to share information (for example two schools in different states). Have students decide how to solve the problem from there.

2 - Explore why the Greeks (Pythagoras) considered the circle (in two dimensions) and the sphere (in three dimensions) to be the perfect shape. Tie a string in a loop. Place the loop on a table and shape it into a square, a rectangle, a triangle, a circle. Using small tiles as units, measure each time the area of these shapes. The circle will enclose

the largest area. That is to say that the circle (and the sphere in 3D) is the shape that offers the smallest perimeter (or surface) to an area (or volume). Think of the shape of a drop of water falling. Why is it round in vacuum, and why would it change shape slightly when falling through the air?

3 - Compare the maps of Ptolemy, Martellus, Waldseemuller, and a contemporary map of the world. Find other ancient maps of the world. Explore their evolution. What is a map? How do you make a map? Make a map of your house without using a yardstick. Invent your own units of measurement that others can duplicate. Have someone else read the map an interpret it. Or let the student choose the topic for his map.

4 - Follow on a map the travels of Marco Polo. Take time to talk about the places he visited, and imagine their flora & fauna. Why did his voyage take so long? Follow on a map the route of Vasco da Gama to India, and Columbus' proposed route.

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For historical information concerning this unit, Boorstin's The Discoverers is a good source.

7. MAPS

Don Julio led Sophie into the map room, crammed with globes of the Earth, volumes of geography, tales of explorations. Charts and maps of all sorts lined whatever wall space remained between bookshelves. He put his hand on a modern globe of the Earth and spun it gently on its axis. The world continued to spin on its own. He sat back to watch.

"If you were to orbit the Earth one day, and you looked down, this is what you might see. There won't be any names, of course, written next to cities. You won't see all these colors. There might be lots of clouds. But you will see these shapes. And you know, this globe was made before any satelite went up into space to photograph the shape of the Earth. It was a very difficult job to make this map, but it came out just right."

"People had to draw the shape of something they couldn't see," said Sophie trying to imagine what that would be like.

"Right," said Don Julio. "They measured and measured and measured, till it came out just right. But at first people could take only very rough measurements, like the one Erathostenes did using camels to estimate the distance between Alexandria and Aswan. After that more precise methods were developed, and little by little our world began to take shape in our minds. It took centuries to do it."

Don Julio took the globe and put it upside down. All the words were inverted.

"It took people time to get used to the idea that the world is round. You see, people thought you would fall off the Earth if you went to the bottom. So the Europeans who first made maps of the world always placed themselves on top. It just felt better. Gravity, of course, holds us down the same way everywhere."

Sophie laughed and turned her head upside down to look at the world the way she thought was right.

"You don't have to do that," said Don Julio smiling. "It doesn't make any difference what part of the world is on top. Remember, gravity is the same all around."

Don Julio explained that it all started with Ptolemy. He established a convention which now is second nature to us. He drew maps with the north on top, perhaps because most of the known lands would then be in the upper

right hand corner of the map. Who knows. But many native American maps place the east on top. Then north would be on the left and south on the right. East seemed the most important direction since it was that of sunrise.

Next he pointed at the tilt of the Earth. Its axis was not vertical.

"This is another convention. You see, we like to represent surfaces horizontally. In this case, astronomers paced the orbit of the Earth around the Sun on a horizontal plane, so naturally a globe of the Earth would have to be tilted with respect to that orbital plane. If I were to represent the Earth like this," and he put the axis vertically, " then I would have to imagine the rest of the universe in a different position." And with his left hand he seemed to raise the universe just a little to bring it into alignment with the new orientation he had given the Earth."

"The amazing thing still is that the maps people drew of the lands eventually came out just right. The spirit that pushed map makers to do it correctly is the same one that builds spaceships that actually fly. It is the scientific spirit--one of our greatest methods, a marvelous thing. That also took a long time to get it just right. Actually, if Columbus had been more scientifically inclined, the New World might now be called Columbia. After all, he was the first European at the time to find it (except for the Vikings, but that is a different story). Instead it was called America. Let me tell you why."

"In a way, Columbus worked back from an idea. He was convinced he could reach the Indies if he sailed West, and he devoted most of his life to achieving that dream. To make a long story short, when he reached the New World finally, there was no question in his mind that this was what he had been waiting for all the time. He had reached Asia, he thought. In fact, he made his crew swear they had reached the Asian island of Cipangu (Japan)."

"Columbus made a total of four voyages to the New World, between 1492 and 1502. Toward the end, wild fantasy took over scientific evidence. He believed he was only days away from reaching the Ganges river in India, which according to legend led to the lands of Earthly Paradise."

"Voyage after voyage, Columbus had increasing difficulty in convincing others that the lands he reached were indeed the Indies, but the name stuck, at least as far as the native populations were concerned. From then on they were called 'Indians,' certainly a misnomer."

"The rivalry between Spain and Portugal grew. Columbus, who had been turned down by the Portuguese when he asked them first to fund his expedition westward, now had reached his goal and had done it with the

support of Spain, a kingdom that till then had not been involved in seafaring expeditions. To avoid war, the two countries signed a treaty in 1494, called the treaty of Tordesillas, which was later ratified by the Pope. The treaty drew an imaginary line from the Arctic to the Antarctic, 370 leagues west of the Cape Verde islands. Everything to the west of that line would belong to Spain, and everything to the east to Portugal, except for any lands that may already belong to Christian monarchs. This is how Brazil, that fell mostly east of the line, came to belong to Portugal, and why Portuguese is spoken there rather than Spanish."

"How could they divide up the world like that?" exclaimed Sophie. "Didn't they know other people lived in those lands?"

"Oh yes, they did." Don Julio was pleasantly surprised by Sophie's reaction.

"Did the Spanish want to take away their lands?"

"Actually yes, or at least convert them to Christianity." Don Julio smiled at the thought of such grandiose and totally selfish dreams. "You see, religion played a crucial role in the conquest of the New World. It was undertaken like a crusade. Remember that the Spanish had just defeated the Moors and driven them off their land. Now they wanted to go all the way to Jerusalem again. They dreamed of a world entirely Christian, and whoever was not Christian was an infidel and had to be converted or destroyed. The Spanish forced all the Moors and Jews to leave Spain. Those who remained and did not convert to Christianity were often killed, burned at the stake under the Inquisition, sanctioned by the Pope. Those were very sad days for Christianity. People were blind. They created artificial conflicts which then became real ones. And we still continue to think in such simplistic ways. It is easy to divide the world into the good guys and the bad guys. Back then they were the Christians and the infidels. More recently it was democracy versus communism. And so on. As long as people don't take time to understand each other, this type of senseless conflicts will continue. Back in the days of Columbus, this narrow, bigoted mentality led to the destruction of native American civilizations." Don Julio shook his head slowly. "Sad days, sad days. But still, here we are. We are the result of what happened back then. This culture we have, this city, this bookstore. We are in a way the children of Columbus, for better or for worse. I say we make it for the better. Don't you think so?"

"Let me now tell you how America got its name. It had a lot to do with

Columbus' obstinate belief that he had reached the Indies, even though he could show nothing to prove it. In 1497, after two years at sea, Vasco da Gama returned to Portugal, back from the real Indies which he reached by going around Africa, what Columbus called the long way. There could be no doubt that Columbus had not reached those lands. People in Europe became very doubtful of Columbus' claim, but the irony was that no one doubted he had indeed reached undiscovered lands. Had Columbus claimed that, indeed, these were new lands he had discovered, then he would have generated more enthusiasm. His trips would not have been seen as failures to reach the mainland of Asia, but as successes in discovering more and more new lands."

"The news of Columbus' journeys created little enthusiasm throughout Europe because, as we would say now, he did not market his product well. Actually he underestimated the value of his product."

"At the time of Columbus' third voyage, a Florentine by the name of Amerigo Vespucci was in Spain serving the interests of the famous Lorenzo de Medici, ruler of Florence and patron of the arts. Actually, Michelangelo and Leonardo da Vinci lived in Florence at the time."

"Commanding two vessels, Vespucci joined the expedition headed by the Spaniard Alonso de Ojeda that left Cadiz in 1499. When they reached lands already sighted by Columbus in his third voyage, Vespucci decided to head south with his two ships. He reached the coast of South America, although he had little idea what it was, but had to return to Spain because the wooden hulls of his ships were being eaten by worms."

"He made a second trip and crossed the Equator. Once in the Southern hemisphere he is said to have stayed up at night looking at the stars, searching for something like the polar star of the other hemisphere. That is to say, he looked for a star that had the least motion and was over the south pole. He did not find one, although he did admire a formation of four stars which became known as the Southern Cross, the same formation which many years later guided Martin Marquez across the desert in his search for the treasure of El Dorado. The short arm of the cross does actually point in the direction of the south pole, three and a half arm-lengths away."

"Vespucci embarked on his second trip to find a passage to the Indian ocean according to Ptolemy's map. This time he sailed under Portuguese rather than Spanish flag. Once again he faced contradictory evidence, just like Columbus did. Things did not really add up to what Ptolemy had conceived. Now contrary to Columbus, Vespucci did something remarkable, he began to conceive that Ptolemy might have been mistaken. Rather than try

to explain away the contradictions, he wrote to Lorenzo de Medici a letter in which he expressed his doubts. He wrote:

> Rationally, let it be said in a whisper, experience is certainly worth more than theory.

"What wonderful words!" exclaimed Don Julio. "That is the essence of the scientific spirit. What glory for Florence, the cradle of the Renaissance, to have one of its people be the first one to recognize an error simply because he let rationality prevail. And this is really what gave America its name, a fitting tribute since it reflects the spirit of reason and tolerance. Vespucci never engaged in the trade of natives as slaves. He did not destroy. In his second voyage he came to admire a new land which he came to call the Fourth Part of the World, the Fourth Continent. He sailed all the way down to the Patagonia shores--a long way to go at the time. In the spirit of a Renaissance scholar, he wrote with admiration about all the new flora and animals he saw. 'So many species could not have entered Noah's ark,' he noted with pleasure--a heretical conclusion." Don Julio could not help laughing at Vespucci's words.

"You see, when Vespucci's writings became known in Europe, they stirred more excitement than those of Columbus who kept trying to convince others he had reached the Indies, and showed little interest in the wonders of the new lands he encountered. Columbus was afraid that Spain's rulers would stop supporting his trips if he did not reach the Indies and generate revenues. He shipped thousand of slaves to Spain as a form of income. Queen Isabella of Spain was distressed to see her new vassals enslaved. She ordered them returned to their homes, but few survived."

"Vespucci was not concerned with colonization. He was more interested in knowledge. He carried out new measurements of angular distances using the stars and calculating distances sailed. He came up with a new figure of the Earth's equatorial circumference--just fifty miles short of the most recent measurements, an astounding accuracy considering the fact that measuring distances at sea was rather difficult back then."

"Upon his return, Vespucci went back to Spain. He settled in Sevilla. He was soon named "pilot-major of Spain." He was to supervise the licensing and findings of pilots. He tired to organize a third expedition, but unfortunately he died (1512) afflicted by malaria from his second voyage. There was no cure."

Don Julio pointed out a map on the wall. A small sign below indicated it was a map made in 1507 by Martin Waldseemuller. Don Julio put his finger on a long, narrow territory to the left. Sophie read "America" written in small print over this land west of Africa. "This is the first map with the New World on it, and the southern part is called America." Sophie noticed that the northern part was was named "terra incognita."

"Ironic, isn't it?" Don Julio noticed that Sophie was thinking about the name of unknown lands. "Ironic that many people now call wrongly the United States 'America.' Back then, when Waldseemuller coined the name America for the new continent, it designated just South America. But what does it matter now? It's only a little curiosity."

"Is that him?" Sophie pointed at a figure holding a compass on the upper part of the map. "Is that Vespucci?"

"That's him alright. But notice that he's facing Ptolemy." Don Julio indicated the other figure in the map. "After all, Ptolemy did provide seamen with the most accurate map of the world available at the time. It was a point of departure. The German mapmaker Waldseemuller improved upon Ptolemy's work using all the new information that came from travels to the New World, and he was the first one to draw those lands separate from Asia. That was a tremendous leap forward in the conception of what the world was all about."

"What happened was that Spain was quite secretive about its discoveries for fear that giving out too much information would favor Portugal or others. Besides, Columbus' claims were always murky. His insistence that he had reached the Indies was not as challenging as Vespucci's conclusion that he had reached actually a Fourth Continent. So, with the help of de Medici, Vespucci's account of his voyage gained far more acclaim that any information that Columbus published. Waldseemuller used Vespucci's letter describing the New World in the west to draw his map. Later the map was widely circulated, and just like the word 'Indians' remained, so did "America' in his map as the name of the New World. Thanks to the printing press, the name America remained, a fitting name."

"A thousand copies of the map were printed and sold. Years later, when better news of Columbus' voyages reached Waldseemuller, he deleted the name 'America' from his maps. But it was already too late. People had started calling the Fourth Continent 'America.' That could not be changed. Looking back on the episode, it seems that our land got its name almost by accident, and that's how it was."

EXPLORATIONS FOR MAPS

1 - Discuss the implications of Vespucci's thought about experience being worth more than theory. Columbus seemed to be guided by his own theory that he had reached the Indies, even though the evidence did not seem to support it. Vespucci let theory be changed by experience. This is the basis of scientific thought.

2 - Take a look at an existing theory or make up one of your own. What would it take to disprove it? If you disprove a theory, what do you do with the old one? (Notice that Walseemuller kept on his map both Ptolemy and Vespucci. Old theories are not thrown away but modified by new ones.) What happens if experiments agree with a theory? Is that theory correct? (No theory is ever correct. It is always waiting for an experiment to disprove it so it can be turned into a more exact theory in the face of new evidence. That is how science advances.)

3- How are things named. Think about how the name America came about. The new world could have easily been named Columbia (or Colombia!). Explore how names you know came about: street names, school names.

4 - How to make a theory: what are the ingredients? List them and order them from idea to testing. Are theories true? (Theories can make no claim to truth. They are methods to estimate the outcome of events up to a certain degree of accuracy. Some work better than others. The rest is fiction. Newton understood this very well.)

5 - Learn how to use a compass. The compass was first invented by the Chinese, and brought from there to Europe. Columbus used the compass on his voyages. It was a new and vital piece of equipment at the time.

8. LOST CONTINENTS

Sophie wanted to know how Martin Marquez founded the library.

"It took imagination and hard work," said Don Julio. "He also had to make some difficult choices. Perhaps the toughest one was parting with the golden llama he got from the treasure of El Dorado. He decided to sell it to an archeological organization that represented several museums in the United States. He felt good knowing that at least the precious figurine would be in good hands. With the money he got, he had enough for a down payment on this old house. A bank gave him a mortgage. He also formed an archeological and geographical society to raise funds needed to operate the library and to sponsor expeditions. He was lucky to finally get all the support he needed to get started. Babel was founded, and soon Martin Marquez left on an expedition to search for manuscripts around the world. He spent his life looking for hidden treasures and he found many."

Don Julio indicated that Sophie's great grandfather managed to find a forgotten copy of Waldseemuller's famous map--the one he showed her on the wall. He also obtained a Latin translation of Ptolemy's Geography.

"His passion always was America," indicated Don Julio. "He wanted to know more about native civilizations. Let me tell you a couple of things he did." He led Sophie to a small back room of the bookstore which was kept a constant temperature and humidity, like many other areas of the bookstore, to prevent damange to the manuscripts. He removed a large volume from a shelf and opened it on an oak reading table. The book contained mostly illustrations of what appeared to be natives. Annotations in hand written old Spanish accompanied the line drawings.

"This is part of a very long letter which was sent to the king of Spain. Here you see only part of it. It was about 3,000 pages long. It first surfaced in Spain, in the XIX century, at the library of El Escorial, but somehow it vanished from there. Martin Marquez managed to trace it from there across Europe to the Royal Palace in Copenhagen where he found part of it. The bulk of the work had been sent to the Sorbonne, in Paris, to their old manuscripts collection. The text still seemed incomplete, so he returned to Spain. Finally, in Barcelona, in a bookstore that carried unclassified old texts obtained from estate sales, he uncovered the remaining portions of the letter. That part he was able to buy and keep. Eventually he obtained a facsimile of the entire work and had it published. This was the work of an

Inca called Felipe Huaman Poma de Ayala, born near Lima, Peru, not long after the conquest of the Inca empire by the Spaniards. The text became known as Nueva cronica y buen gobierno. It was finished in 1606. Huaman Poma grew up speaking both Quechua, the language of the Incas, and Spanish, the language of the conquistadores. He was bicultural, but grieved at how the traditional Inca ways of life were being destroyed by colonization. The purpose of his long letter to the King was to obtain protection for the Incas so that their culture might not be destroyed. It is not know if the letter reached its destination. Inca culture did not survive, and that destruction was the fate of all native-American cultures, from North America to Tierra del Fuego. Only traces remain of what once was. But fortunately, thanks to the work of archeologists and historians, that past is coming to light little by little so that we may learn forgotten lessons from the wisdom of our ancestors. This was the dream of Martin Marquez, to be a part of this process of recreation of our past."

Don Julio pointed to a map on the wall. "That's Cuzco in Peru, one of the two main cities of the Inca empire. The second one is Quito, the capital of what now is Ecuador." He sat down next to Sophie.

"Well, Martin Marquez was in Cuzco back in the year 1911. There he met an explorer by the name of Hiram Bingham who was in the area looking for Inca ruins still undiscovered. He had little luck. The two became good friends and Bingham invited Marquez to join him in one of his trips. They travelled along the Urubamba river (which along with the Apurinac, the second river important in Inca life, feeds into the Amazona). After nearly a week, nothing had been found, although local peasants told them tales of hidden ruins in the area. Marquez suggested they leave the valley and head for the crest line. Bingham agreed. The Incas, after all, were highland people. Most of their highways followed ridges and high grounds instead of valleys. It was logical then that they would also build on top of mountains rather that in valleys, like the Europeans do."

"Two days later, they stumbled upon one of the greatest archeological finds of the times: the forgotten city of Machu Picchu, built on a mountain above the Urubamba. It was a marvel of architecture. Now it was deserted and partly covered with vegetation--a relic of the past."

"Martin Marquez felt he had come full circle. From this city, lost and found, the treasure of El Dorado had been collected and sent south along the Inca highways, on the backs of hundreds of llamas, and buried in a cave precisely were he once found it and also lost it. The golden llama he kept

had helped him make it back to this place, at this time, to witness again the beauty of the Incas."

Don Julio opened a large book filled with color photos. "There," he said, "revealing a two page spread of Machu Picchu. "Isn't it great?"

Sophie was impressed by the beauty of the mountains, but of the city she saw only scattered ruins which did not seem all that attractive. She could not figure out how anyone could have lived there.

"You have to imagine, Sophie. With your mind's eye you have to go back in time to when the Incas still walked those slopes. Let those ruins come alive again."

And Sophie tried as hard as she could.

Sophie wanted to know how the natives first came to America. She had heard that our ancestors came from Africa once upon a very long time ago. It was easy to see how they got from Africa to Europe and Asia. But America was separated by two vast oceans. She wondered how they made it across.

"No one really knows," said Don Julio, "but there are many theories. Some might have come by boat or rafts across the Atlantic and the Pacific oceans. In more recent times the Vikings did precisely that crossing nearly five hundred years before Columbus. Led by Eric the Red, they sailed first to Iceland, then to Greenland. Then his son, Leif Ericsson reached what is now known as Baffin island, north of the Hudson straight, close to the Artic circle. They encountered native populations and never settled, but at least they showed that such crossing was quite possible before the discovery of the compass."

"Recently, scientists think that plate tectonics might explain the mystery. The earth's crust is in a state of very slow but constant change. Islands are formed, like the Hawaiian islands, and land sinks under the waters also. 180 million years ago there might have been just one single land mass which then began to split apart. But of course this does not solve the problem since by the time that our ancestors came about, the land masses were already quite separated, and the world of 65 million years ago looked quite similar to today, except that Europe and North America were still connected at the arctic circle zone. Perhaps that was the route of migration, just before the last ice age."

"Others think there were lost continents in the Atlantic and the Pacific, which sank into the oceans because of cataclysms. Those lands provided bridges to America. There is very little evidence to support these claims. It is mostly legend. But who knows. It might be true."

"The first one in recent history to mention Atlantic was the philosopher Plato from ancient Greece. Plato (in his dialogues Timaeus and Critias) locates the continent of Atlantis beyond the Pillars of Hercules (Gibraltar). (More recently, it was discovered that the Greek island of Thira is actually the rim of a sunken volcano, once active. This could be the legendary Atlantis, but it is not located in the Atlantic where Plato placed it). The science fiction writer Jules Verne imagined Atlantis in his book Twenty Thousand Leagues Under the Sea."

"Yes," exclaimed Sophie. "I read it. Captain Nemo and the voyages of the Nautilus. Yes, I remember. In the novel, Atlantis was a sunken city illuminated by an active underwater volcano."

"Well, there are other legends of a lost continent called Mu, in the Pacific ocean. It is not much talked about. Just like Atlantis, a cataclysm also destroyed this land, and it sank into the ocean, leaving no visible traces behind."

"I wonder how real all those stories are," said Sophie.

"I've wondered that also." Don Julio leaned back on his chair. "And that's what I like so much about it. They make me wonder. We need to do that every day. It's good for you, just like breakfast." He laughed and hugged his niece.

"What's so funny?" Sophie started to laugh also.

"You know what?" Don Julio paused to look at her. "I'm really glad you came to visit me."

EXPLORATIONS FOR LOST CONTINENTS

1 - Explore the theory of plate tectonics to explain how continents evolved, mountains formed, volcanos came about, and earth quakes, fault lines. Students can use the local library to gather information.

2 - Contact the archeology department of a local college or university or museum to find out what research is now going on in Connecticut or other areas that students might visit. Visit a site. Think about the archeology of the place where you live, its history.

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9. NUMBERS

(Note: because of its complexity, this section
is mostly suitable for 5th and 6th graders)

Martin Marquez began taking his son Carlos along during his searches for valuable manuscripts ever since the boy learned how to read and write so that he could also be of help. The young boy soon learned the rudiments of native languages in the areas they visited. He learned the Quechua of the Incas, the Nahuatl of the Aztecs, and most of all the Quiché of the Maya. With the few words that he knew he was able to play with the children. This is really how he learned some of these languages: by playing with his new friends. And as a matter of fact, his father would even ask him at times to help him translate to Spanish difficult texts.

"The education that Carlos received during these early years was quite a varied one," Don Julio told Sophie. "He not only learned how to count like we do, but also the way the Maya counted. Let me show you."

Julio Marquez took out a large sheet of paper and placed it on his desk. He explained how in our decimal system we write numbers by filling from right to left a series of decimal spaces. The first place on the right indicated how many "ones" you have, up to nine. When you get to ten, that first place becomes "full" and you write in a zero and put a one in the space to the left (number 10). The number in this second space tell how many 10's you have. So for number 10 you have, reading from right to left, no "ones" and one "ten". The number 23 would mean three ones and two tens. The third place to the left is for how many 100's you have (10X10). The next one for the 1,000's (10X10X10), and so on and so on.

Now the Maya had a vigesimal system. That means they counted using the same principle as our counting system, but instead of going by tens, they went by twenties. For example, our number 23 in their system would read 13 because the 1 indicates the number of 20's. And our number 33 would read 1 (space)13 because the 1 still indicates one 20 and the 13 is 13 ones. Of course, they developed a different notation than ours. A dot was a one, a line was a five, and the zero looked like this: It looks like a shell. Probably they used actual shells to indicate zeros.

"Let me tell you," said Don Julio as he wrote down a few numbers for Sophie. "The concept of zero was reached only twice in human history. It was used in India and came to us through Arab mathematicians. The other inventors of the zero were the Maya, or perhaps their ancestors. Such genious! You see, the zero tells us either one of two things. That there is nothing, or that a decimal space is full. It's a very important concept to make calculations. See how the Maya used it:"

6 •|
40 : ⬭ (Numbers could be written in lines, from left to right, or in columns, from top to bottom)

76 ⁝ •|||

100 | ⬭

132 •| :||

"This may look strange to you," noted Don Julio. "Why not write using the decimal system?" you would ask.

"Yes, really," Sophie smiled while she tried to write larger number and had some difficulties translating one system to the other. "This gets a little complicated the bigger the number."

She wanted to write in Maya the number 72,763. This meant she had to figure out how many 20's, 400's (20X20), and 8,000's (20X20X20), the number had, starting from the larger numbers. First she divided the number by 8,000 and got 9 plus a remainder of 763. Then divided 763 by 400, and got 1 plus a remainder of 363. Next 363 by 20 and got 18 plus a remainder of 3. The number in Maya, but using our numbers, then read: 9 1 18 3. In Maya notation this would read: ⁝| • :||| ⁝

"Well, you see, our computers would think that our counting system is far too complicated." Don Julio laughed at Sophie's puzzled look. "Computers use a binary system, called base two. The Maya had a base twenty system. Ours is base ten. Let me show you what this looks like. It's the same idea but much simpler."

"Basicaly in binary you have only two numbers, the zero and the one. We have ten numbers from zero to nine in decimal. So our 3 in binary is 11, and 4 is 100. 5 is 101. 6 is 110. And so on. This is easy for the computer. It

needs only to see if a binary slot has a mark (a "one") or not. A computer would recognize the number 6, for example, as a yes, yes, blank."

Don Julio gave Sophie more examples and asked her to try coming up with a few binary numbers of her own.

"It's hard to count in these other systems." She frowned.

"Not any harder that in decimals. But you see, we are so used to decimals that we don't even think anymore about what we do. As kids it took us years to learn our numbers and how to add, subtract, multiply, and divide. We had to memorize a lot of things. If you spent that much time with the Maya system or the binary, you will also be just as good with them. Fortunately we only need to use one system to count. Since we chose the decimal, we stay with it and become good at using it. The other systems are curiosities, and when we try them they help us understand what it is that we do when we count in our own decimal number system."

"How did the Aztecs and the Incas count?" asked Sophie.

"The Aztecs had a somewhat similar system to the Maya. But the Incas had something quite different which we don't even know exactly how it works. It was a portable way to keep records which the Incas called 'quipus.'

Don Julio went over to a file cabinet and from a lower drawer he took out a bundle of colored strings with knots. He stretched it out and gave it to Sophie.

"This is a quipu. Your grandfather found it in Peru. It will soon go to a museum in France."

Sophie stretched out a short rope a couple of feet long. From it hung several strings of various colors with knots tied in different arrangements.

"Each color meant a different type of thing counted, like corn or taxes, and the knots would represent the numbers depending on the position down the string."

"This reminds me of an abacus," said Sophie.

"What a great thought you had," exclaimed Don Julio. "Yes, the quipu is like a fixed collection of abacuses of different colors. Now the beauty of the Chinese invention for counting, is that the beads in the abacus are movable. The Chinese did not have to tie and untie knots to change numbers. All they had to do was slide a bead, and that was it. What genius! The abacus was the first calculator, the first computer. It is still used today. I wish I had one. They are a lot of fun to use."

The conversation gradually changed from counting to writing. Sophie now wanted to know about how the native americans wrote.

"Well," said Don Julio. "That's a little more complicated. I'm afraid my knowledge here is pretty limited, but this I can tell you. The Maya were the ones to develop the most advanced writing system of all native american civilizations, at least as far as we know for now, and this system is still being deciphered. Aparently the Maya wrote in a way that is half way between our phonetic alphabet and the Chinese ideographs. Let me explain."

"The Chinese have very complex writing, perfected over the centuries. You have to memorize about 7,000 ideograms to be able to write well. That's a lot to remember." Here Don Julio drew a few Chinese characters with his fountain pen, and explained to his niece what they meant. "Your grandfather taught me a dozen of these symbols. They are a little like Egyptian hieroglyphs, but far more stylized. I think over time the Chinese simplified the pictorial side of the symbols so that now they look like bunches of lines."

Then Don Carlos wrote the Spanish translation of the ideograms. He was able to do it much faster.

"See, combining just thirty letters and blank spaces, plus a few punctuation signs, you can write anything you want. The alphabet is a collection of most of the sounds or phonemes needed to come up with any word you want. But the Chinese have an ideographic writing. Each one of the symbols is like a tiny idea. They write by combining these basic ideas or images. It's very beautiful. Also very difficult."

Don Julio reached over to a shelf and pulled a book. He opened it on the desk. He showed Sophie examples of Maya writing (see Coe's book for illustrations).

"This is how they wrote?" exclaimed Sophie looking at the rows of symbols.

"This is it. Scholars are still learning how to read them. But they believe these glyphs combine phonetic (sound) elements with ideograms (pictures). This writing seems to be more ambiguous and difficult than ours. For the Maya, reading and writing was a specialized art practiced only by very few who took time to study."

Sophie was surprised. "What's the use of having numbers and writing if just a few understand what it means?"

"Writing for the Maya was different than it is for us. They used it to a large extent for keeping records and to create a very accurate calendar. These records had religious purposes. They were used for divination. To make decisions, often times one had to consult a priest who would make

predictions based on what he found in these records and in the calendar. There was secret, mystery, ritual involved in these divinations."

Sophie asked Don Julio to tell her more about the Maya calendar. He led her to another room. There on the wall she saw four large circles made out of cardboard and covered with inscriptions near the rims. The circles were arranged in pairs. Don Julio indicated that the pair on the left was called the 260-day count. The two wheels touched at one point where the numbers 1 to 13 in Maya notation coincided with one of twenty glyphs or names on the other wheel. The two circles were meshed together so that by turning one, it resulted in 260 different combinations of numbers and names. These are the 260 days of the Maya and all Mesoamericans.

"These other two cogwheels," said Don Carlos pointing to the larger ones containing more involved notations, "they are the 52-year calendar round. One cogwheel has the 260 days, and the other the 365 days of the year, called the 'vague year' since really a year is 365 days and 1/4 long, but the Maya could not come up with a fractional notation for this. What we do is just add an extra day to the year, the so called leap year, every four years. The Maya had also divided the 365 days of the vague year into 18 months of 20 days each, plus 5 'nameless' days. These 5 days at the end of each year were a time of uncertainty. The Maya had to feast and wait these days to see if there would be a new year. When the year started again, then there was great celebration."

"The Maya had given separate names to the days of the 'vague year.' Now, when you turned these two cogwheels, you would get two sets of names for every day, and these names would repeat themselves once every 52 years. This was a very important duration of time for the Maya."

Don Julio explained that it was very important to keep track of time because that was the only way to have a history. That was the only way the Maya could talk about their past and also look toward the future. To do it they had to be able to count time. "They could not count hours and minutes like we do, but they were quite good at counting days and years."

"Using the calendar they could predict eclipses and the motion of the moon and a few planets like Venus, Mars, and even Jupiter, which they saw wandering through the night sky against the fixed background of stars."

"How could peoples on different continents come up with similar systems of writing? The Maya and the Chinese were so far apart." Sophie was puzzled by the similarities of the two.

"Well, some people talk of lost continents in the Pacific and the Atlantic called Atlantis and Mu. This may very well be more myth than truth."

"What probably happened is something far more simple and fascinating. It may very well be that when given a few similar conditions, two isolated cultures may go through similar stages. This is what some researchers call 'parallel worlds.' For example, just about all of our major civilizations were star-gazers. They were fascinated by the regularities of the motions of the moon and planets. They also developed calendars to record the amazing rhythm of the seasons, the regularities of the sun's motion. Humans, you see, are very curious. Perhaps that's what makes us what we are."

"By comparing what is similar and different among cultures, we may very well learn much more about who we are. That is why the study of ancient civilizations is so interesting. It does tell much about us now.

EXPLORATIONS FOR NUMBERS

1 - Do addition and subtraction using the vigesimal and binary systems. Pattern the operations after those in the decimal system. In binary, the operations follow the same algorithms. Explain what an algorithm is. The Maya numbers may have to be changed to arabic notation to do the operations.

Examples:

DECIMAL	BINARY	VIGESIMAL
2 + 3 = 5	10 + 11 = 101	∴ + ∴ = |
6 + 7 = 13	110 + 111 = 1101	•| + ∴| = ∴||

BINARY NUMBERS

0	0
1	1
10	2
11	3
100	4
101	5
110	6
111	7
1000	8
1001	9
1010	10
1011	11
1100	12

↓ KEEP ADDING 1 TO THE RIGHT OF BINARY NUMBER ↓

2 - Talk about Champollion and the Rosetta stone. It was this stone that broke the Egyptian code. Unfortunately there is no equivalent document about the Maya hieroglyphs. Have students do projects on the Maya and Aztec calendars. Also on the Rosetta stone.

3 - Invent a simple hieroglyphic language and make a few sentences in it. Divide students into groups and have them decipher each other's hieroglyphs.

4 - Make the two wheels of the Maya 260-day count and see how it works. Next imagine the 52-year calendar round.

5 - Explore the value of the zero in calculations. See how more difficult it is to calculate using Roman numerals which lack the zero.

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10. QUETZAL

"When he was just about your age, your grandfather Don Carlos was already traveling with his father around Central America, searching for valuable manuscripts and hidden ruins. Martín Marquez dreamed that his son would one day run the Babel bookstore and continue the work he had started. But he did not want to force Carlos to do as he wished. Martín Marquez always thought that his type of work had to be done from the heart, and if Carlos' heart was not in it then there was nothing he could do about it."

"The fact was that in those early days, the heart of young Carlos was definitely not into books, neither big nor small, neither lost nor found. So the most Martín Marquez could do was take him along in his expeditions and hope that his son would find his way, a good way."

Don Julio told Sophie how young Carlos most of all wanted to play all day long. He would play hide and seek among the broken pillars of Tula. He pretended to be a mountain climber on the pyramid at Teotihuacan. And when his father took him to Mexico city, he used to disappear in the morning with friends and not return till it was almost dark.

Martín Marquez began thinking that it might be better after all to leave young Carlos in Uruguay instead of bringing him on these trips. He just could not do his research and also look after a boy that was growing dangerously independent for his age.

"But something happened that changed his mind," explained Don Julio. Something happened north of Mexico city when they returned to the barren ruins of Tula, once the city of warriors, now a mysterious monument of a secret past. The ruins were surrounded by grassy plains, mostly dry in the heat of summer.

Carlos was stretched out in the shade of a tree, one of the very few trees that still grew in the area. He could see in the distance his father copying designs carved in stone columns. Carlos felt too warm to help out so he decided to rest instead.

Suddenly he heard a bird sing. It was a soft and melodious chirping which Carlos never forgot. He looked up through the branches and saw a small bird that stared back at him as if there was something immensely curious about this boy lying in the shade of the tree. When Carlos stood up to have a closer look, the bird calmly flew away and was gone before he knew

it. Along with the song, Carlos was surprised by the colors of this strange bird. Its breast was red and white, but all the rest was bright green, emerald green, he thought, and the bird had two beautiful long tail feathers, long and slim, perfectly green.

When he told his father what he had seen, Martín Marquez could hardly believe what he heard. "A quetzal!" he exclaimed, as if it was some amazing discovery. "What you saw was a quetzal bird. And you said it looked at you?" Young Carlos told his father one more time what had happened, and Martín Marquez seemed even more amazed.

"You see," said Martín Marquez as Carlos sat by his side, "the quetzal you saw lives only in the highland forests of Central America. It nests deep inside the tropical cloud forest and never comes out. The Maya who lived there thought it was a magic bird, like a god."

"A legend tells that every 52 years the Quetzal comes out of the forest to call the Maya and guide them to a secret place where they gather to read and celebrate once again the Popol Vuh."

"What is the Popol Vuh?" asked Carlos.

"Oh," said Martín Marquez, pleased to see that his son had taken an unexpected interest in what he liked best. "The Popol Vuh is an 'ibal', a 'seeing instrument' used to tell past or future events, to tell about the present. It is not some complicated machine. It is just a book."

"A book?" said Carlos very surprised.

"Yes, a book, but a very unusual book. It was not written the way we do. It was written using Maya hieroglyphs, as far as we know. Now what's fascinating about reading a book written in such glyphs is that some of it stays the same, but other parts are open, like a picture."

Carlos looked very puzzled. "I'd like to see this book!" he exclaimed. "Where is it?"

"No one knows, not the original book that is. There is a version available which you can get in most bookstores now. But that is only a transcription of a reading of the Popol Vuh. Someone wrote down in phonetic Quiché the story of the Popol Vuh as told from the hierogliphic book. Then the Quiché version was translated to Spanish and all sorts of other languages. That's the version we can get now. But you see, that is not the real Popol Vuh, the 'seeing instrument.' That book is said to exist, and only the quetzal bird knows where it was left by the last Maya that read it. The sacred book was hidden because the conquistadores were destroying all the Mayan texts they could find thinking they were evil things. So the Mayas hid

their most sacred book to prevent its destruction. And this happened centuries ago. The book has not been found. One of my greatest wishes is to be able to find it again, because it must be one of the best books ever written."

"That's why I'm so excited. The quetzal bird came to you. Fifty two years must have passed since the last reading of the Popol Vuh. It must be time once again to gather."

"But the bird flew away," protested Carlos.

"Do you remember which way it went?"

"That way, I think." Carlos pointed in a southeasterly direction.

"Let's go then!" exclaimed Martin Marquez. "What are we waiting for!"

Young Carlos did not know what to make of his father at this point. To follow a bird seemed pretty crazy. Well, he also had the vague feeling this was the start of an exciting adventure. He did not wait to be asked twice, and immediately went to help his father pack.

Martin Marquez took a bearing with his compass and drew a line on a map indicating the direction in which the quetzal flew away. The line passed north of Mexico city, touched the shore of the Gulf of Mexico at Coatzacoalcos, then headed of the ruins of Palenque and Tikal further east.

"That's our way," said Martin Marquez. They left on horseback.

Along the way, Martin Marquez explained that both Palenque and Tikal were two very appropriate places. These two cities were once the heart of the Maya civilization during its golden age around the 6th century. The Maya inherited much from the Olmecs who once lived in the area they were now crossing--the hot lowlands of Veracruz and Tabasco states--around 800 B.C. to 400 B.C. They sculpted in basalt stone huge heads that wore something like helmets. The Olmecs vanished and no one knows really why or how. "It is a mystery," indicated Martin Marquez, "and perhaps one day archeologists will solve it."

Carlos felt uncomfortable in the tropical humid heat of the jungle. He preferred much more the highlands where the vegetation was less cluttered. He thought the jungle was even a little scary, especially at night when they camped in whatever clearing they could find. The dense forest around their little campfire resembled a pack of whispering giants that waited for them to get into the tent to make their move. Carlos imagined these spirits of the

forest had gigantic Olmec heads. When he finally settled to sleep in his sleeping bag, the mysterious sounds of the night jungle seemed to become louder, deeper. But he always managed to fall asleep right away, exhausted from a day's journey, and he would not wake up till dawn, when more cheerful sounds invited him to come out of the tent into a radiant green jungle.

It was one such morning that he saw the quetzal again, looking at him from a distance with inquisitive eyes. The bird seemed to recognize the boy and satisfied flew away before Martin Marquez had a chance to see it.

"Yes," exclaimed Carlos' father, "we are on the right track." The bird had flown precisely in the direction of Palenque and Tikal. So after a quick breakfast they packed and left. "Three days more to Palenque." noted Martin Marquez. He went on to explain that the downfall of Palenque and Tikal happened around the 10th century. The region was probably overpopulated and the land was exhausted from too much cultivation. Famine followed, and at the same time the Maya were visited by invaders from the west called the Toltecs who introduced the cult of a god-king called the Plumed Serpent--Quetzalcoatl. "Their ancient capital was Tula," he said.

"That's were we just came from," blurted Carlos. "That's where I first saw the quetzal."

"Right you are." Martin Marquez smiled. "We happen to be retracing the route taken by the Toltecs when they descended on the Mayas. And remember that the name of their supreme god Quetzalcoatl is part quetzal."

All along the jungle trails, Martin Marquez told his son how the Toltecs once were considered by their successors, the Aztecs, to be masters of wisdom. Their god, Quetzalcoatl, was a gentle deity. It did not call for human sacrifices, such as those the Aztecs carried out regularly to appease their violent gods. The benevolent Quetzalcoatl received offerings of snakes, precious stones, and butterflies. That's why the Toltecs were able to develop so well, because they were kind to nature and peaceful. They lived in harmony with the land and with themselves.

But then something happened, and the Toltecs for the first time were unable to trust their own kind spirit and let themselves be changed for the worse. What happened was that another god, Tezcatlipoca, the Smoking Mirror, began to gain more and more followers among the Toltecs. This god was the opposite of Quetzalcoatl. He was the lord of the night, patron of evil

wizards. He demanded warfare and human sacrifice. It is said that one day Tezcatlipoca tricked Quetzalcoatl and got him drunk and made fun of him when he could not defend himself. Quetzalcoatl felt very ashamed that he let himself be fooled like this, and decided to leave Tula. A number of Toltecs followed him toward the Gulf of Mexico. A legend says that he sailed eastward and that he promised to return in the year called "One Reed" to free his people from the evil god Tezcatlipoca.

Carlos Marquez understood now that the Toltecs that followed Quetzalcoatl were the ones that joined the Mayas. The legend of Quetzalcoatl's return to deliver his people spread to the neighboring Aztecs. And this legend had quite a bit to do with the downfall of the Aztecs when the Spaniards arrived, let by Hernan Cortes, because Moctezuma II, ruler of the Aztecs at the time, thought that Cortes could be Quetzalcoatl returning, and he thought there was little he could do to prevent this god from fulfilling his prophesy. And part of the prophesy was fulfilled, for one thing the Spaniards put an end to right away were human sacrifices. In that sense Quetzalcoatl prevailed in the end. There were to be no more human sacrifices.

"And probably I didn't tell you," said Carlos Marquez, "the Aztecs were known by another tribal name: the Mexica. And that's where the name of this country comes from, Mexico, the land of the Aztecs, since at the time of the Spanish Conquest they were the most powerful natives in the region. In this way they gave their name to a future country."

"There it is again." Carlos pointed straight ahead.

This time Martin Marquez saw the quetzal for the first time. It waited for them perched on a tall tree. Then it flew away, always in the same direction, leading them further into the heart of the jungle.

EXPLORATIONS FOR QUETZAL

1 - Look up the Quetzal bird in a guide of birds of Central America. The Aztecs believed that people had a "nagual" which means in nahual language of the Aztecs something like an animal counterpart. In this way the lives of people were closely linked to that of the fauna. For example, the hummingbirds were supposed to be the souls of fallen

warriors. The name of one of the most admired persons in ancient Mexican history, the wise ruler of Texcoco just north of Tenochtitlan, was Nezahualcoyotl, which means Fasting Coyote, implying self-control and humility. Other animals in the region are spider monkeys, howler monkeys, peccari, deer, wild turkey, jaguar, tapir, and a host of other more exotic fauna. The eagles were common also. Legend has it that an eagle signaled the place were the Mexica were to settle and found what became known at Tenochtitlan. The god Uitzilopochtli told them to settle where they saw an eagle on a plrickly pear cactus. That symbol is now part of the Mexican flag.

2 - Have students choose their "naguals." Have them tell how thinking like such "nagual" might give them special "powers."

3 - Notes on Maya and Aztecs: The Maya were composed of several tribes. The Popol Vuh tells that even though all these tribes "came to light in unity," their languages differentiated while they were in Tulan (the place of reeds or cattails, possibly located somewhere in Campeche or Tabasco.) The Quiché, authors of the Popol Vuh, were one of these tribes. They settled in the highlands of Guatemala. was strongly discouraged. Rules were inflexible.

The Aztecs had schools for their children of upper classes: the Calmecac. The principles stressed were self-control and self-knowledge, and most of all how to overcome fear and follow authority. When a child entered the school, the parent advised: "You are not going to be honoured, nor obeyed, nor esteemed. You are going to be looked down upon, humiliated, and despised. Every day you will cut thorns for penance, and you will draw blood from your body with these spines." (The Mighty Aztecs, p. 127) Compare that system of education which began at about age 10, with the one we have. What are the advantages and disadvantages? What is the value of creativity and innovation that we stress? What is needed to create something new?

To understand why people like the Aztecs and Mayas did not stress the European notion of creativity and inquiry derived from the ancient Greeks, one needs to realize that even for us, faced with the

immensity of the unknown, any foray into that realm seems futile. Consider that only over the last few decades we have come to realize there are billions of stars in a galaxy, there are billions of galaxies. We can't even count that much, let alone explore them. Still, the characteristic of our culture, at least in its scientific side, is that curiosity remains overpowering and we continue to ask and press on, rather than give up, in a widening unknown.

4 - Note that the descendants of the Mayas comprise the largest ethnic group in America after the descendants of the Incas in Peru, Bolivia, Chile and Argentina. They number about two million and they still maintain their traditions and languages. In Guatemala they are still persecuted at times by the army because they are different from the more European established culture. One poignant illustration of this sad state is the film El Norte (available in video for rental).

11. MAYA

Carlos and his father followed the quetzal out of Palenque. The dense jungle seemed to swallow away the ruins. When the boy turned to have a last look at the ancient city, there was nothing left.

"It was like a dream, eh?" Martin Marquez looked back also. "It seems to have gone away to where dreams come from."

"Now I really want to find that Popol Vuh book."

"Another day and we'll be in Tikal. Maybe we'll find it there."

"And go home with it."

"Not this one, Carlos. This would be an archeological treasure. It will go to a museum so that anyone can see it."

Before the day was over, they crossed the mighty Usumacinta river into Guatemala. A peasant took them across treacherous rapids on his dugout canoe carved out of one solid piece of mahogany. Beyond the river, the jungle grew increasingly dense.

"How could the Maya live in this thick forest?" asked Carlos.

"They cleared small sections of the jungle to plant their crops," explained his father. "They cut the trees, burned the area, and worked the ashes into the soil as fertilizer. Then with sticks they made holes in the ground to plant corn. The problem was that the tropical soil is not very fertile, and after about three years of working the same plot, the soil was exhausted. So they let the jungle grow back and cleared another area. But eventually, the Maya that lived in this jungle grew to the point that they could not feed themselves. Plus there are years of drought in the jungle. The dense forest helps retain the moisture. Now when you clear it away, the sun just dries up the land very quickly."

"The Maya also mastered a very elaborate system of raised beds in swamp areas. This was super intensive farming that did not exhaust the land. But the problem was that it required a lot of care. And in times of wars those raised beds went to waste."

"That's how the cities of Palenque and Tikal were abandoned. People starved in this region, and after this great period in Maya history, they split into groups: some to the north in the Yucatan peninsula, and another in the highlands of Guatemala, the Quiché Maya."

"I hope we don't go hungry like they did," said Carlos.

"We have to learn better the balances of nature to figure out the reactions to our actions. Every time we do something like clear a jungle patch to cultivate, or cut the rain forest, or divert water from rivers to irrigate arid lands, any of these things makes nature tremble. It will try to reach a new balance which will be different from the way things used to be before. So it is important that we learn to understand these changes and try to anticipate them and avoid harmful consequences. Everything you do to nature, everything you do period, has a consequence or a reaction. Some are good, some are harmful. We just have to learn to anticipate and do what's best for the earth as a whole."

To this day, areas of the jungle look like a patchwork of different shades, where the forest had once been cleared. The new growth has a younger looking coloration. In the end, the jungle may have benefited from all this grooming. The new growth might have invigorated it. Fortunately the cutting did not go beyond a breaking point. The jungle was allowed to grow back.

"What would happen if the rain forests of Central America are lost?"

"Who knows!" Martin Marquez shrugged his shoulders and sighed.

The quetzal came to greet them again.

"There it is." Martin Marquez pointed straight ahead through a clearing in the forest. Beyond them stretched to the horizon a sea of green. Five slight tips of stone protruded above the tree tops like islands. "The tops of pyramids--shipwrecks of the forest."

"Doesn't look like much at all."

"Tikal used to be a vast city. The jungle swallowed it."

Carlos gasped at the thought of a vanishing of such vast proportions.

A couple of hours later, Martin Marquez and his son reached the first ruins of Tikal, and as they walked toward the heart of the ancient city, they were taken totally by surprise. The jungle had been cleared away. The ruins stood clear of vegetation. Pyramids rose to the sky. Walls, steps, platforms, entryways to subterranean chambers. It was a beautiful maze of stone and green lawns everywhere.

"I didn't know about this," wondered Marquez. "And I'm pretty well informed. Who cleared all the jungle away?"

As they walked on, they began to hear voices. It sounded like a crowd. Suddenly, behind a pyramid, they saw a vast gathering of peopel. There must have been thousands. The sweet scent of burned sap filled the air. Martin

Marquez explained the sap came from a tree called "Sangre de dragón" (Dragon's blood). It burned like incense just as in the Popol Vuh. The book said that the mother of the Hero Twins was going to be sacrificed because she was pregnant but had no husband. As punishment, her heart was going to be torn out of her chest, brought to a sacrificial fire and burned. But the woman convinced those who were going to take her heart to use instead a thick lump of this sap which had hardened and looked very much like a fresh heart. The guards felt sorry for the woman and did what she suggested and set her free. They brought back the sap. The trick worked. Instead of a human heart, sap was burned, and no one except the guards knew the difference. All delighted at how sweet it smelled.

Incense floated in waves of bluish smoke.

"Who are all those people?" asked Carlos.

His father hesitated. He observed the scene carefully. The women wore "huipils" (a traditional brocaded rectangular vestment made of cotton with intricate colorful designs woven over a square surface that fit on the shoulders and around the collar) and the men had ponchos just as colorful. Underneath them, they wore common clothes.

"These are the Maya," he said, now sure of his words. "They must have cleared Tikal to meet here in secret, undisturbed by western civilization. A perfect place. You see, the Maya didn't just give up their traditions after they were conquered by the Spaniards. No, they assimilated Spanish customs, but at the same time kept their own customs and saved them from destruction. That is also the story of the Popol Vuh. Let me tell you what happened."

Carlos seemed concerned. "If they see us here, are they going to kill us?"

His father laughed. "Of course not!" and he motioned Carlos to sit and hear his new story.

"The Popol Vuh that we can read now begins more or less like this." Martin Marquez paused to gather his thoughts, then quoted from what he remembered of the Popol Vuh: "This is the beginning of the ancient words. They account for everything. We shall write about this now amid the preaching of God, in Christendom now. We shall bring it out because there is no longer a place to see it, a council book, as it is called. There is the original book and ancient writing, but he who reads and ponders it hides his face. It takes a long performance to complete the emergence of all what is

written." He paused and smiled. "How do you like that?"

"I am not sure what you said, father."

"Oh, let me explain. First of all there are the ancient words of the book of council. That is the true Popol Vuh in hieroglyphic form, in ancient words. According to the Maya, they are the only ones that account for everything within the four corners of their world. Now a long performance is about to begin. Someone is going to interpret the glyphs, someone who hides his face from the Spaniards who are trying to convert the Maya to Christianity. He must be a priest, one of the few Maya skilled enough to read their own hieroglyphs. And someone is going to write down this long performance of the text, this long interpretation of the glyphs. This person will write it down in phonetic Quiche (one of the Maya languages)."

"The transcription took place in the XVI century, probably in 1558, when a new 52-year cycle began, now for the first time under Spanish domination. Then in 1701, a friar named Francisco Ximenez saw the Quiche manuscript in his parish in Chichicastenango, in Guatemala. He made the only surviving copy of the Quiche manuscript, and then translated it to Spanish. Father Ximenez's text ended up in the library of the University of San Carlos in Guatemala City. But it was taken away from there by a French priest named Charles Etienne Brasseur de Bourbourg. Somehow, many years later, the manuscript went from Paris to the Newberry Library in Chicago, where it is now. That library has a great collection of Native American texts, in a city whose Indian name means 'place of wild onions.' Quite a journey for that long performance of a missing text!"

"Now, getting back to that performance or long reading, you see, at the time the Spaniards were destroying any ancient text they could find in hieroglyphic form because they thought they were sacrilegious. Perhaps that is why the reader hides his face. He hides the manuscript in glyphs so it won't be destroyed. After the reading, he probably hid it very well, and it is there today, here in Tikal somewhere. And it will be seen once again now, and interpreted in a long performance, because just as it was in 1558, now begins another 52-year cycle."

"I'm sure they will not let us see the book," said Carlos. "We are not Mayas."

"I don't know what will happen. I hope we'll see it."

"I still don't understand why the Spanish priests were destroying the Mayan manuscripts. They were not bad things."

"That's religion for you. At times people become very intolerant and

they want everyone to think as they do, and that is very wrong. Fortunately, the Mayas never forgot their culture. They went along with the Spanish that conquered them, but they kept alive in secret their traditions, often mixed with Spanish traditions to hide them better. What you see now is the result of that hiding."

Carlos followed a few steps behind his father. They headed straight for the gathering place among the pyramids. Faces turned when they approached. Suddenly the voices quieted down, till the vast court was totally silent. Carlos came next to his father after he stopped by the edge of the lawn. Nothing moved during these uncertain moments.

Just then the quetzal flew overhead. It came from the direction that Martin Marquez and his son had taken, circled twice above the courtyard, and landed on top of the highest pyramid. The beautiful bird had suddenly become the center of attention of everyone there. Hushed voices emerged from the crowd prompted by the quetzal's appearance. When the bird finally flew away moments later, the people seemed more at ease with the two strangers that had come to them, as if the bird had washed away their apprehensions.

A man emerged from the crowd and walked toward them. He wore a traditional huipil over his plain shirt and pants. When he was barely a few feet away, his stern face eased into a smile. He spoke words that Carlos could not understant. To his surprise, his father responded in the same strange language, and the two shook hands.

When Martin Marquez had a chance, he told his son the person's name was Juan and he was a daykeeper. This meant the man was a diviner and keeper of the Maya calendar. He welcomed them because he saw that the quetzal was friendly to them and this was a good sign. It meant they could join their celebration.

Night fell upon the city of Tikal. Fires went up to illuminate its ruins. Shadows danced along the pyramids. Juan had invited Martin Marquez and his son to join them for a ritual that evening. He said they were going to do a long performance of the ancient words. They had waited many years for this moment. And the performance would last all night. Martin's face lit up with pleasure. He knew what the long event was all about. "The Popol Vuh," he said. Juan nodded as if he had expected that Martin Marquez would know of this.

Carlos was very surprised that his father had interpreted correctly the quetzal's flight all the way from Tula to this remote city in ruins. He thought it was no more than an old story.

"Me too," said Martin Marquez, "I thought so too," and he could not help but laugh.

Then the words of the Popol Vuh began to fill the air. One person far in the distance began the narrative. When he paused someone else continued, and then another, and another. It seemed after some time that everyone would get a turn to tell a passage from the Popol Vuh. When Juan's turn came, the man stood up and began to speak. Just like the others, he had no text to read from. He seemed to tell a story he knew by heart, and it ressembled quite well an episode in the Popol Vuh, except for some details which Marquez thought had been deliberately changed.

"So where is the book?" he wondered.

Just then glare from a nearby fire illuminated Juan's huipil as he turned slightly. Marquez had noticed that the beautiful geometric designs on the huipil looked familiar. They were abstract, yet he recognized them. And suddenly he realized he found what he had been looking for all along. There it was: the text, the Popol Vuh, right in front of him, delicately inscribed in the embroidered design of Juan's huipil.

And later that night, when Marquez managed to look at the huipils that others wore, he confirmed his discovery. Everyone there wore on his and her huipil the portion of the text recited. These people were the hidden book. The book had been dismembered so that it would not be destroyed by the Spanish misionaries, centuries ago, and all these families had passed the ancient words from generation to generation, and every 52 years they gathered at Tikal and put the Popol Vuh together again (remembered it, literally) for a long performance.

"And that's how it was," Don Julio told Sonia.

"But uncle, what about the original Popol Vuh?" she asked. "Was that found?"

"No."

"Well, I'm going to find it."

"Good luck." Don Julio smiled. It was an impossible wish. But then again, that was the stuff this family liked best.

EXPLORATIONS FOR MAYA

1 - Ecological balances: use the example of Maya agriculture in the rain forest to explore other fragile balances. Some possibilities are: the cutting of the rain forest of the Amazon. Due to the enormous scale of the cutting, in this case the damage may be irreversible, and the new equilibrium that nature will reach may prove to be disastrous for the region and also impact world climate. The depletion of the ozone layer is another example. What is very interesting in this case is that scientists discovered that ozone (molecules composed of 3 oxigen atoms, rather than two) filters out ultraviolet light, that there exists such a layer in the upper atmosphere, and that its depletion is caused by certain specific chemicals we produce. So our technology not only is the cause of ozone depletion, it also is the cause of its gradual correction. There is a good lesson to be learned here. Change is inevitable, but it has to be brought about with as much care as we can muster.

2 - The greenhouse effect can be used to explore further the balances of nature. Some scientists think this is a totally destabilizing effect which will have disastrous consequences because the temperature will continue to increase unchecked. Other scientists think the earth will regulate itself and keep any serious rise of temperature in check because it has mechanisms to maintain the balance where it is now as far a large temperature changes. Basically, a rise in temperature will produce more clouds which in turn will cool the earth. But of course, this is all speculation. We simply don't know how the environment will respond to a rise in temperature.

3 - Explore Don Julio's last comment: many times the goal is not as significant as the search. So, if the goal you are after seems just too difficult, don't give up if what you find along the way is worthwhile. At the same time, don't let the goal prevent you from looking around, and considering other alternatives as you move on. It is wise to remain flexible. That's how you are open to discoveries. A perfect example is the discovery of the New World. Compare the attitude of Columbus and that of Vespucci. Columbus was so obsessed with his goal that he failed to notice he had made an enormous discovery.

Vespucci remained open minded and flexible. He was the one who understood first that new land had been discovered.

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12. POPOL VUH

Martín Marquez and his son Carlos followed the jungle trails until, all of a sudden, out of the dense vegetation began to appear furtive shapes of stones.

"We're near the ancient city of Palenque," said Martín Marquez. He soaked up the sweat on his forehead with his sleeve. The sharp calls of howler monkeys echoed around them. A minuscule hummingbird sipped nectar from flowers by the side of the trail, undisturbed by their presence. Its green and blue feathers glinted in the light. A golden toad leaped away into the dark vegetation. "Unexplored ruins stretch for miles all around here. This was once a wonderful city."

"Now it belongs to the animals," said Carlos. He tried to catch a salamander, but it took off faster than he could blink.

"Looks so, doesn't it. The Maya had great respect for the animals, just like the Aztecs and most native peoples that I know of. The Aztecs even had a word for this: 'nagual'. According to them, every person had a 'nagual', an animal that was like their guardian angel, something like a counterpart. It was important for persons to discover their 'naguals' at some point in their lives."

"Do I have a 'nagual'?" asked Carlos.

"You should, if you believe the Aztecs and the Maya."

"How do I know my animal?"

"Somehow it becomes clear." Martín Marquez smiled. He remembered the dolphins, ostriches, and condors that once saved his life when he searched for the lost treasure of El Dorado. If anything he had three naguals.

"I'd like to know what it is."

"Someday you will."

The steep terraced pyramid known as the Temple of the Inscriptions appeared in the distance. Martín Marquez told Carlos that a secret burial chamber had been found deep within that pyramid. If a sarcophagus could be hidden so well that it tooks years to find it, why not a book? When they reached the deserted pyramid, Marquez felt his heart beat away in anticipation as it did in younger days. He led the way up the steep central stairs and into a dark chamber. He lit his candle lamp. Hieroglyphic panels of stone encircled them.

"It's spooky in here," whispered Carlos.

"Nothing to worry."

"How do you know?"

"Just a hunch." Martín Marquez patted his son on the back. The candle lamp send a shiver of shadows along the silent walls. "This way."

Carlos followed his father to a corner of the vast chamber. There, hardly visible, was the entrance to a long corridor that sloped downwards into what Carlos thought were the very bowels of the pyramid.

"We're not going down there, are we?"

The answer was obvious. His father moved on down the damp slippery steps of the descending narrow corridor, taking along the only light they had. Not to be left behind in the dark, Carlos followed close behind.

At this point, as Sophie listened with anticipation the frightening details of this descent, Don Julio stopped the narration and headed to a bookshelf. He pulled a book and returned to sit down next to his niece. He showed her an autographed front page dedicated to Martín Marquez."

"Let me read to you what Alberto Ruz wrote about this. He was the one to discover this chamber."

(Here read from The Mysterious Maya, pgs. 74 to 78 which quotes the Mexican archeologist Alberto Ruz Lhuillier on his discovery of the chamber. These passages convey the excitement of an archeological discovery.)

Martín Marquez searched the entire pyramid, but despite his efforts, he failed to find the Popol Vuh. There were no traces, no hints, no clues, nothing. During another frustrating search of the area, now from the outside of the pyramid to see if there was another possible entrance to a hidden chamber yet undiscovered, Carlos saw the quetzal once again. It flew to the top of a tall tree. He pointed the bird to his father.

"We've been looking in the wrong place."

Carlos and his father headed toward the tree where the quetzal stared at them. But when they got close, the quetzal flew away once again in the same direction they had been following all along.

Julio Marquez pointed out that the quetzal had waited for them on a ceiba tree which the Maya considered to be the tree of life. It had a slender bottle-shaped trunk. Beyond it were three sapodilla trees surrounded by rubber trees, mahoganies and cedars.

"The sapodilla," explained Julio Marquez, "has a white sap called

chicle that is used to make chewing gum.

He explained that rubber from the rubber trees was very important for the Maya because they used it to make balls for their ball games. Players wore heavy protective belts of wood and leather. The rules and procedures of the game are unknown, but it seems they had to hit the ball with hips and elbows only, and one scored by throwing the ball through a small ring of stone placed about eight feet up against a stone wall. Contrary to basketball, the hoop was not horizontal but vertical, so the ball had to be thrown from the sides.

After wars, it seems that the victors played ball games against captured leaders. The games were rigged so that the defeated leaders always lost for a second time, but after this second defeat they were beheaded.

"You see," said Martin Marquez, "the ball game is very important in the Popol Vuh. The book has many stories intertwined. Let me tell you about the one dealing with the game."

"There once lived a set of twins called One and Seven Hunahpu who used to play ball on a court what was on the eastern edge of the earth, at a place called the Great Abyss. Their noisy games offended the gods One and Seven Death of the underworld called Xibalba ('Place of Fright'). These gods challenge the twins to a ball match in their court located at the western edge of the underworld. The twins descend into the underworld and as they travel to the ball court they must face a series of horrible tests. They fail the last test and rather than have them play ball, the gods of the underworld kill the twins, and the head of one of the twins, One Hunahpu is placed in a tree next to the court. For the first time the tree bears fruit which look much like the head of the twin. The tree is called the calabash tree. Its fruit is the size and shape of a human head."

"A woman from the underworld goes to admire the calabash tree, and she likes the tree so much that she becomes pregnant through the spirit of One Hunahpu that inhabits the tree. This woman called Lady Blood goes back to where the twins used to live and gives birth to another set of twins called Hunahpu and Xbalanque."

"The twins get to know the animals around their house. A rat tells them where their father and uncle had left a set of ball game equipment. And once again ball is played at the edge of the Great Abyss, and just like before, the gods of the underworld are angered by all the noise and challenge the twins to a game in their court."

"And like their father and uncle before, the twins descend to the underworld and journey to the ball court at the western end. But the twins manage now to outsmart the tricky gods and they live long enough to make it to the ball court. What follows is a series of games in which the twins manage to outsmart One and Seven Death once again. During complex series of encounters the twins are killed, but after their ashes are thrown into a river, they come back to life as catfish and a day later take their previous human form and gain great fame as illusionists."

"One and Seven Death hear about these magicians and attend one of their performances. The twins do an illusion in which one cuts the other's head and removes his heart, then brings him back to life. One and Seven Death are fascinated by the trick and want the twins to do this mock sacrifice on them. The twins agree right away, but instead of an illusion, they carry out a real sacrifice and kill once and for all the evil gods of the underworld."

"The twins reveal their identity to everyone else in the underworld, and demand an end to human sacrifices. From here on, offerings will involve only the burning of a ball of croton sap shaped like a heart, and also animal sacrifices."

"The twins visit the burial place of their uncle at the edge of the ball court, and from then on, graveyards and ball courts have the same name. Finally, the twins rise as the sun and the moon from the underworld. And so ends the story of the hero twins."

Martín Marquez pointed out that the different episodes of the story of the hero twins also functions as a calendar describing times of the year, phases of the moon, motion of Venus, the rise of celestial bodies from the east and return to the underworld in the west where they undertake the dangerous and dark journey back east to rise again the next day.

In this way the Popol Vuh told the past, present and future of celestial bodies, and much more. "The Popol Vuh told also about the birth of living things," indicated Martín Marquez as they walked along jungle trails.

"The Maya thought it was much too unlikely that people would be made correctly from the first try. The Maya gods of the Popol Vuh had to create men four times before they were satisfied with the results. First they created beings with no arms to work. They could not talk. Their descendants are the animals of today. Next they made people of mud. But these creatures could not move. Eventually they dissolved back into nothing. In the third attempt the gods made people out of wood, and the results were quite good

at first. But these people could not time their actions well and they did not pray to the gods. All the elements turn gradually against them, from animals to their own household utensils, seeking revenge from mistreatment. Finally these wooden people become the monkeys we see today. The fourth attempt was successful. The gods fashioned four men out of corn meal and water. They had perfect vision and perfect knowledge of everything. But the gods regretted having made people as wise as gods. So they fogged their vision and made four wives for them.

This is how the Maya as well as other Mesoamerican people were created, and they scattered speaking different languages still in darkness because the first dawn had not yet arrived. And when the sun finally rose for the first time, the Quiche Maya rejoiced because although they were separated from their brothers, all now enjoyed the same dawn."

EXPLORATIONS FOR POPOL VUH

1 - Compare the stories of creation in the Bible and the Popol Vuh. Explore differences and similarities. Why do you think in the Bible mud turned out to be the right ingredient for creating people, but in the Popol Vuh it was not, and instead it was corn that finally worked?

2 - The Maya think of dualities as complementary rather than opposed. Compare that view to our conceptions of dualities: good/evil, life/death, real/unreal, myth/history. Come up with other dualities.

3 - The Maya think that <u>patterns</u> from the past may happen again (but do not expect the past to repeat ifself exactly). Explore in this sense how the Popol Vuh can be a book of the past, present, and future. Do we have books about the future? Is science about the future? Astronomy? Environmental sciences?

4 - The Popol Vuh is not a book of prophesies (like the book of Nostradamus, or astrology). It does not tell what will happen. It only holds patterns that may repeat themselves. It is for the reader to

interpret the patterns in the book and in nature. Explore this difference when compared to the type of astrology and prophesies we are more used to.

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13. COLUMBUS

"Columbus had a very hard time getting three ships to sail," noted Don Julio.

"That's weird," exclaimed Sophie, "when you think that he discovered the New World."

"Things are never that simple, Sophie. It's a big mistake to think that good things come easy, or that there were three ships waiting for Columbus to lead them to the new world after his genial idea. History never happens that way, and most important Sophie, you will never get anything done if you think that you can get things easily and right away. It takes hard work. Now what makes these discoverers famous is that they were driven, obsessed, almost crazy with some ideas, and they worked hard to see them through. They just loved what they were doing, no matter how difficult. That's the secret, Sophie. Ten percent inspiration, ninety percent perspiration."

"Remember that the Ferdinand and Isabella, the King and Queen of Spain at the time of Columbus, funded the trip more out of rivalry with Portugal than anything else. They really wanted to open a good sea route to the Indies before the Portuguese. They wanted to dominate the spice market. It was Columbus' persistence that got him to sail."

Sophie asked her uncle to tell her more about this extraordinary seaman.

"Well, he was born in Genoa, now Italy, back in 1451, and took to sea when he was barely 14. His real allegiance was to the sea. He served anyone who allowed him to keep on sailing in new adventures. He was even a pirate for a year, serving Rene D'Anjou. Columbus was a man of big dreams, you see. His ultimate goal was to reach the Earthly Paradise which he thought was located in the Indies."

"Columbus gained an intimate knowledge of the winds at sea, along the Atlantic coast. He was the only one to realize at the time that to sail due west from Europe one had to go south first, at least as far as the Canary islands (islas Canarias), because there the winds blew mostly to the west, precisely the way he wanted to go. These winds became known as the trade winds. A Portuguese expedition attempted to sail west from the Azores but failed to go far because at that latitude the prevailing winds blow to the east. It was his great skill as navigator that allowed him to cross the

Atlantic before anyone else, except for the Vikings, but what they did at the Arctic circle was island hopping compared to the magnitude of Columbus' voyage."

"In his first voyage (1492-93), he sailed on August 3, 1492 with three ships: 'Santa Maria', 'La Niña', 'La Pinta' and on October 12 he reached first an island of the Bahamas, then Cuba and Hispaniola (Española). At first he was well received by natives, but when he took by force seven inhabitants to bring back to Spain, they began to think the Spaniards were as nasty as the 'caniba' or 'cannibals' from islands further south who came to take people away to eat them. Columbus thought 'caniba' referred to the people of the Great Khan in China. This persuaded Columbus that the island now known as Cuba was Cipangu itself, in Asia.

"During his second trip (1493-96) now in command of 17 vessels, he reached Guadalupe islands and Puerto Rico as well--an island the natives called 'Borinque'. Columbus became governor of the lands he found, and went on to make two more voyages of discovery, but he never managed to reach what he finally wanted which was perhaps Earthly Paradise. On land, Columbus was restless and intolerant. The King and Queen of Spain had him replaced as governor. The new person in charge imprisoned Columbus and sent him back in chains."

"Poor Columbus," said Sophie. "He must have felt really bad."

"That was probably the lowest point of his life. When he reached Spain, the King and Queen realized he had been made a prisoner and set him free immediately. But things were never the same afterward."

"By now lots of other people were sailing what he considered his seas. They were discovering lands and making claims. Columbus wrote angrily: 'They all made fun of my plan then; now even tailors wish to discover'. You know, he was right."

"Columbus embarked on his fourth and final voyage in 1502. That same year a 27 year old boy named Francisco Pizarro reached Hispaniola and settled there. And in 1504, the same year of Columbus' return to Spain, a 19 year old boy by the name of Hernan Cortes sailed to Hispaniola. The new generation was arriving to take over what Columbus had brought to light. They were the future conquistadores."

Don Julio went on to explain that not all the conquistadores were ruthless and greedy as portrayed. There were some exceptions. One of them was Hernando de Soto. He served under Pizarro in the conquest of the Inca

empire, but soon returned to Spain disgusted with the harsh treatment of the natives and the intrigues of colonial life.

"But he had really itchy feet. Two years later he was back in the New World. He took a different direction though. Rather than west or south, he explored north. In 1539 he landed in Florida, by Tampa bay. From there he crossed unknown land all the way to Mobile, Alabama, and from there northwest to what is now Memphis, Tennessee. There he reached the Mississippi, the 'father of the water', crossed it and headed west to Oklahoma. Then, a year later, he decided to turn back, hoping to find rich cities along the way. He never did. He encountered many local tribes and managed to negotiate peace treaties with some. Others he had to fight. Two years later he died of illness in Louisiana. His friends buried him in the Mississippi."

"And that is one of many stories of brave explorers."

EXPLORATIONS FOR COLUMBUS

1 - Have students carry out projects on Columbus. Follow his voyages on a map. Read from his diaries.

2 - The historical Columbus has changed over the centuries. Explore how his image has changed. Understand that history is constantly revised.

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A wealth of material has been written on Columbus. For more information consult The Christopher Columbus Encyclopedia. Simon and Schuster, 1991.

14. Hernán Cortés

The Babel bookstore prospered under Martin Marquez and his son Carlos. The two became known round the world among book collectors. They were always welcome at bookshops that specialized in ancient texts. There weren't that many worldwide, and what united them all was a passion for searching for manuscripts thought to have vanished. The news of any important find would spread among this network like wildfire, and rightly so. Such discoveries were cause for celebration.

When Carlos married, that was also good cause to celebrate, and so was the birth of his two children, first Sonia and two years later Julio. His younger son would eventually remain in charge of the bookstore. Sonia became an anthropology professor at Boston University, and it was in Boston that she had her daughter Sophie, who in time came to like visiting her uncle Don Julio back in Uruguay, at the Babel bookstore where all got started and still continues.

Don Julio sat back on his chair and looked at a row of large books. He asked Sophie to pick one out for him and bring it to the desk. It was a large atlas of the world.

"Carlos would not return to the land of the Maya and the Aztecs for many years," he said, and opened the atlas at Central America.

"Your mother Sonia, and I were already teenagers when he came up with this idea of a little adventure. You see," said Don Julio, "he wanted all three of us to follow the route of the conquistadores."

"Did you do it?" asked Sophie.

"Of course we did. When Carlos wanted to do something there was no turning back, at least not for him. We had the choice to stay or go with him. We decided to go. Wouldn't miss it for the world." He pointed on the map the spot on the Mexican coast where this journey began. "The year was 1519. The place is now called Veracruz. Hernán Cortés arrived on February 18 with 11 ships, 508 soldiers, 100 sailors, and--most important as we will see--16 horses. By coincidence, a crucial period of a 52 year cycle was about to end for the Aztecs and the Maya."

Sophie remembered her uncle had told her before about the Toltecs who left the ancient city of Tula to follow their god Quetzalcoatl (which means "the plumed serpent'). The legend said that Quetzalcoatl would return one day from the sea by the east, to free his people from the evil god

Tezcatlipoca, lord of the night. He would return from the East precisely in the year One Reed of the new 52 year cycle. That was just about when the Spaniards arrived by ship from the East. Moctezuma II, king of the Aztecs, trembled when he was told of the arrival of these strange people dressed in steel armor, with frightening guns and cannons, and with horses they had never seen before. The legend played to the advantage of Hernán Cortés, for he was thought to be Quetzalcoatl. Moctezuma decided to welcome him. But when he realized Cortés was not a god, it was already too late.

But the badly outnumbered Spaniards had two more important allies which helped them defeat the Aztecs. It was a badly divided empire at the brink of civil war. Many local tribes had been dominated by the Aztecs and treated harshly. They wanted to defeat the Aztecs rulers, so they allied themselves with the Spanish army.

The deadliest ally, by far, was disease. The Spaniards, without knowing it, brought illnesses the native populations never had, and they proved deadly, although they hardly affected Europeans since they had become resistant. These were smallpox and measles. The Europeans had antibodies to fight these viruses, the native Americans did not. Sophie remembered her uncle telling her that in less than 50 years, 90% of the population of Mesoamerica down to Peru and Bolivia (nuclear America), died of epidemics. That is, according to estimates, more than 39 million people out of a total population of 59 million.

"Hernán Cortés was a bold man," explained Don Julio. "He had to contend first of all with political intrigue in his own ranks. The Spanish governor of Cuba who saw in Cortés a rival, did not give him authority to conquer new lands. So when he arrived in Central America, he sent away his enemies in an expedition, then founded the town of Veracruz. By that time he had become allied with the local Totonac people who hated the Aztec (also called the Mexica). With such strong support, Cortés named officials to the town of veracruz, and in turn they gave him the authority to go out an colonize new lands. With this legal maneuver, he set himself free from the authority of the governor of Cuba, and now responded only to the command of the town of Veracruz. This done, he burned his ships so that no one would leave, and he set out to conquer the Aztec. So, you see, Cortés had many enemies from the very beginning."

Don Julio paused to think a moment. "If things had been easier for him from the very start, he might not have had the stamina to do what he managed to do. It is said that necessity is the mother of invention."

"Cortés got lucky early on," explained Don Julio. "You see, as soon as he arrived in Central America, he rescued a Spanish castaway who had lived with Maya for 8 years and knew their language, and with him came local princess who spoke a Maya language, as well as Nahuatl, the language of the Aztecs. Their help was invaluable in securing the help of local tribes who wish to free themselves of Aztec domination. This would have been impossible to do without being able to communicate through his interpreters. Cortés was able to understand the customs and problems of local people, and use that knowledge to his advantage."

Don Julio moved his finger from Veracruz to Cempoala, just north along the shore. "We went this way," he said, "to where over 400 years ago, Cortés met the Fat Chief, ruler of the Totonacs. There we climbed a piramid where Cortés must have seen a human sacrifice for the first time. He was horrified at these people plucking out victims' hearts and burning them in offering to their gods. Cortés told the Fat Chief to stop these sacrifices and in turn they would be better friends. Fat Chief agreed, but still was distressed that the Totonac gods might get angry for lack of sacrifices, and would ruin their harvests. This was one of the rare peaceful changes Cortés brought about. The rest were mostly done by the sword. You see, when he finally got to the Aztec and tried in the same way to end human sacrifices, it did not work, and that's how the real fighting began."

Don Julio traced with his finger the route from Zempoala to Mexico city, where Tenochtitlan used to be, the capital of the Aztec empire, a city larger than any Spanish city at the time. "Along this very difficult route, Cortés fought some minor battles but mostly built alliances, particularly with the fierce Tlaxcalan people. By the time he reached Tenochtitlan he was ready to fight if necessary. Well, that did not happen." Don Julio shrugged his shoulders with a smile. "Not at first." He reached for an oversized volume that rested flat on a shelf, and opened next to the map. He showed Sophie a drawing of what Tenochtitlan might have looked like. It was a majestic city, far beyond anything the Spaniard expected to find. "You see, Moctezuma still thought that Cortés was Quetzacoatl. So rather than fight, he decided to welcome the stranger and his men. He invited them into the city."

Tenochtitlan was built on the shallow lake Texcoco, which used to be as much as 20 miles wide. Now nothing remains of the lake, and Tenochtitlan eventually sank into the muddy bottom and Mexico City rose gradually over the heart of the Aztec empire. Don Carlos had little to show

his children of that ancient capital when they visited Mexico City. Recently, however, several city blocks were demolished to begin excavating the Great Temple, the center of Tenochtitlan, from underneath the downtown area.

Sophie pressed her uncle to explain what happened after Cortés and his men were invited into the city.

"Well, religion began to divide them. The Spaniards could not stand human sacrifices. Eventually, during a visit to the temple of Huitzilopochtli, supreme god of the Aztec, Cortés smashed the gold mask of the idol, and shortly afterward took Moctezuma prisoner before the king had a chance to strike back at them. He forced the ruler to place Christian symbols on the temple of Huitzilopochtli. Moctezuma agreed reluctantly, and hoping for a peaceful solution, he handed over vast treasures to be sent to the king of Spain, Carlos V."

"All was calm until Cortés had to leave the city to battle a Spanish force sent by the governor of Cuba to arrest him. He left behind Pedro de Alvarado, a fearsome and cruel commander in charge of 150 men. The Aztec called him Tonatiuh, the sun, because he was blond and handsome. It was this group that started the bloodshed which became impossible to stop. The Spaniards in the city were besieged. Cortés returned victorious with 1,300 men. Meanwhile, Moctezuma tried to appease the Aztec and spoke to them from a rooftop. But his people no longer obeyed him. They accused him of having given in to the enemy and now were going to fight the Spaniards under the leadership of Cuitlahuac, Moctezuma's aggressive brother. Moctezuma himself was killed, possibly by his own angry people. The Spanish were defeated during a night battle known as "La Noche Triste"--the Sad Night."

"Cortés retreated to Tlaxcala and managed to recover from a serious head wound. Then he assembled in Texcoco an army that included 20,000 Tlaxcalan warriors. He built ships on the lake to attack by water as well as land. And while these preparations where underway, the real defeat of the Aztec was taking place silently, unknown to the Spaniards. A smallpox epidemic raged through Tenochtitlan. Many died. Among them was their chief Cuitlahuac, king for only 80 days. Cuauhtemoc was crowned in his place. He led the final defense against the Spaniards and their allies."

"The battle was as hopeless as it was savage. The Aztec sacrificed all prisoners. Twice Cortés escaped death because the Mexica wanted to take him alive and sacrifice him. The Aztec retreated to the twin city of Tlatelolco, built on the lake next to Tenochtitlan. Finally, after nearly three

months of battle, Cuauhtemoc was taken prisoner, and the remaining Mexica defeated. So immense was the destruction that Cortés ordered the cities abandoned. They were uninhabitable."

"Legend says that Cuauhtemoc died hanged from a giant ceiba tree which, ironically, is considered to be the tree of life. For the Maya and the Aztecs, a ceiba marks the center of the universe."

"This was the end of the Aztecs, and the beginning of a new Mexico. There are no monuments to Cortés in Mexico city, but a triumphant statue of Cuauhtemoc dominates one of the most important intersections of the capital."

Sophie noted in a somewhat sad tone that every country in the world had such bloody moments in its history. "I hope one day there will be no more wars and that people will learn to accept each other's differences and live in peace."

"I'm afraid we still have a lot of growing up to do," said Don Julio. "I hope we make it."

"Everyone has to try."

"That's the problem." Don Julio smiled. "That's also the solution."

EXPLORATIONS FOR HERNAN CORTÉS

1 - Explore the motivations of Cortés. What pushed him to risk his life against incredible odds? In general, the missionaries wanted to convert the natives to Christianity, and the conquistadors were after wealth and power. An interesting film in this respect is The Mission (for teachers only).

2 - What did Cortés think of the human sacrifices carried out by the Aztec? Could war be considered a form of human sacrifice?

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15. THE WAY TO QUEZALTENANGO

Carlos Marquez led Julio and Sonia to a gentle ridge overlooking the city of Quezaltenango in Guatemala.

"Here took place the biggest battle between the Mayas and the Spaniards." Don Carlos swept his hand in the direction of the valley bellow. "It was Pedro de Alvarado again. You remember him from 'la noche triste.' Here he faced vast numbers of Quiche warriors commanded by Tecum. The year was 1524. Alvarado found the way here with his soldiers and native allies. Tecum came to face him. He wore his finest jewels and quetzal feathers for battle. It was a sad day for the Maya."

"I remember Sonia felt sad to hear how well Tecum was dressed," recalled Don Julio. "He was going to war, not to a party. But it seems that fighting among tribes was a way of life among the Mayas. And perhaps that is one of the sad consequences of the Popol Vuh. You see, the book tells the future, as well as the past, because life for the Mayas consists of a repetition of patterns, just like day follows night. It was only after death that the Maya would enter a delightful place where there would be no more pain, with abundant food and sweet drinks, and where one could finally rest under the cool shade of trees and labor no more."

"That's pretty much the same in many other religions," exclaimed Sophie.

"Well, it is. Many religions see life as a preparation for something much better after death."

"But I like it over here," protested Sophie. "I like it a lot."

"I do too. And I bet you that if the Mayas had thought that way they would have put an end to human sacrifices and to wars, and really enjoy the life they had, rather than think of another life they may never have, and which really is not important at all here on earth. I think that was the original teaching of Quetzalcoatl, the gentle god, but he never returned after being chased away from Tula by Tezcatlipoca, the god of warfare and human sacrifice. Perhaps he may still return one day."

"As for Tecum, he died wearing the quetzal feathers on his head, the Aztecs that now helped Alvarado called the place Quezaltenango." Don Julio pointed out the city on a map of Central America. "Tenango means 'the place

of' in Aztec language. To this day, the Maya still call the city Xelá, its original Maya name."

"This battle at Quezaltenango marked the defeat of the Mayas," said Don Carlos to his children. "Elsewhere in the Yucatan peninsula, the Spaniards moved in gradually, and eventually set up their capital in the north, in the ruins of the city of Tiho, and called the place Merida because the buildings there reminded the Spaniards of Roman ruins in their city of Merida back in Spain."

"But the Mayas were really never entirely defeated. In the dense jungles they set up independent villages, and defended themselves with guerrilla tactics. And there was good reason for this. You see, after the conquistadores passed, then came the missionaries. Now they wanted to convert all the natives to their religion, and if persuasion did not work, the conversion was forced."

"One of the things the missionaries did was burn the ancient Maya texts, their codices, because they were the work of the devil according to the missionaries. This was a very sad thing for the Maya. Their texts were precious. They contained their history, their identity. So these stories were remembered even after the burning of the texts, and the stories were told and passed on from generation to generation. It was at that time that the Popol Vuh was saved from destruction. the original hieroglyphic manuscript was hidden, and its transcription to phonetic Quiché circulated."

"So, even if outwardly the Maya seemed converted, within themselves they always maintained their old beliefs. Their spirit was not subdued. And it may very well be the adversity of the conquest that strengthened them and rid them of all their internal warfare so they could concentrate on what they really believed. The spirit of the Maya lives on."

EXPLORATIONS FOR QUETZALTENANGO

1 - Explore more and compare the gods Quetzalcoatl and Tezcatlipoca.

2 - Fighting still goes on in Guatemala between descendants of the Maya and the Spaniards. See the first part of the film El Norte in this respect (for teachers only).

16. WAITING FOR VIRACOCHA

"Jungle choked the passage south of Panama." Don Julio pointed out on a map the location of the capital of Panama. "Even today you can't go much farther than about fifty miles east of the Panama canal. The Pan-American highway that goes the entire length of the continent is cut right there. It is the only missing link. Otherwise you could drive from Fairbanks, Alaska, all the way to Ushuaia in Tierra del Fuego."

"You could cut your way through with a big machete." Sophie slashed the air twice as if she faced the rain forest herself.

"Much easier to take a boat. No sweat."

"No fun!" complained Sophie.

"You wouldn't want to face the mosquitos in there. They're as big as airplanes."

"Oh, come on!"

"Well, I'm glad my father didn't, and your mother was glad too. We just sailed on down the Pacific coast sipping lemonade. That's probably what Francisco Pizarro did too when he embarked on his third and final expedition to conquer the Incas. We landed more or less where he did over 400 years ago, at Esmeraldas, in northern Ecuador, and followed his trail to Guayaquil and Piura in northern Peru. There began one of the most incredible episodes in history. You see, the King of Spain had given Francisco Pizarro the title of Governor and Captain General of Peru. This was incredible for neither the King nor Pizarro had any idea of what Peru looked like. He was given this grandiose title to conquer for Spain and for himself a region more than twice as big as Spain. Pizarro knew of the Incas, but had no notion of the enormous size of their empire. So he set out from Piura with only 167 men to face at Cajamarca, in the highlands of northern Peru, an army of more than 50,000 Inca warriors. But luck was on his side in more than one way. And actually, history pretty much repeated itself. Pizarro was going to achieve what Cortés had done before in Mexico. The two conquests were strikingly similar."

Don Julio told Sophie how his father led them up a precipitous mountain road from Piura to Cajamarca in the footsteps of Francisco Pizarro and his men. They gained altitude so quickly that they had to rest more often in the thinner air above 10,000 feet. The light felt different at that height, more sharp, more intense, and the sky was of a darker blue

because of the thinner atmosphere. The Spaniards didn't know if they would have the energy to fight. That was the least of their problems.

"The highland men had adapted physically to the environment. They had larger lung capacity, higher count of red blood cells to deliver more oxygen. Cosmic ray and ultraviolet radiation are also higher. Lowland people have to wear hats to prevent rapid sunburns. And the temperature differences between night and day are also quite extreme. You can sweat at noon and freeze at midnight. But the Spaniards pushed on. They had a few advantages of their own, like horses, armor, firearms."

"When we reached Cajamarca, we learned of the other advantages the Spaniards had. One was that the Incas stood divided. A bitter, bloody civil war raged through the empire. The north with Quito as capital, was in the hands of Atahuallpa, and the south in the hands of the legitimate emperor Huascar, Atahuallpa's half-brother. He ruled from Cuzco, the original Inca capital, over 1,000 miles south."

"There was more." Don Julio explained how the Incas believed that a god by the name of Viracocha created them in his own image by the shores of lake Titicaca, south of Cuzco (at 9,800 feet, this is the largest lake at that altitude). After creation, Viracocha walked north as an old white man, and by Manta in Ecuador he said goodbye to his people and moved away over the Pacific ocean. The Incas believed that Viracocha would return again in times of crisis. The Incas of the south who were losing the civil war thought that Pizarro could very well be Viracocha come to deliver them from the rebels. Once again, the myth of a god's return played into the hands of the Spaniards.

Sophie was surprised to learn about the divisive civil war among the Incas. She asked her uncle to tell her how this could have happened.

"Well, I think it happened because the Inca empire grew too quickly. Basically three emperors did it in less than 100 years. The Inca empire grew enormously and became too big to manage. It went from something smaller than Connecticut, up in the highlands of southern Peru, just north of lake Titicaca, to a long empire on the Andes 2,500 miles long, more than the distance from New York to San Francisco. It was just as extensive as the Roman empire, but it had no chance to mature. The Incas organized a very good system of communication. Imagine, it took 20 days to send a message from one end of the empire to the other. That was amazing considering the roads went through the mountains. Messengers called "chasquis" were stationed every 2 miles along the main highways and they would relay

verbal messages and also pass along quipus knotted with information. Each chasqui knew by heart his section of the highway. Often they had to run in the dark, in storms, in any weather. When a message arrived they had to pass it on, no matter what."

"Our present communication systems allow us to send information at the speed of light. That is almost instantaneous."

"How fast is light?" asked Sophie.

"I don't remember exactly." Don Julio went to a reference section of his bookstore and searched through a book of facts. "Ah, here it is. The speed of light is almost 200,000 miles per second. That's how fast we can send messages. The chasquis could relay messages at no more than 150 miles a day. But that's how it was for everyone in the world before the invention of the telegraph. The fastest was probably the Pony Express!" Don Julio laughed. "But you could not gallop on horseback along the Inca mountain highways, and besides, they didn't have horses. To run was the fastest for them."

"Still, the Incas were at a disadvantage when it came to communications. You see, they had no written language." Don Julio explained that the Incas had quipus for numbers. They used a very elaborate system, unknown to us. They had to have special readers to decipher their own quipus. They were called "camayocs." These rememberers or readers had to explain constantly to each other how their own quipus were coded so they could be read. The Incas, as opposed to the Maya and Aztecs, used a decimal system, and just like them, they also used a zero. They had a number to indicate nothing (or that a decimal place is full). The concept of zero entered Europe from India, through Arabia.

"Now, if you have to send a message orally, unless the messenger remembers it by heart, he will change the message slightly when he passes it on. Now imagine what happened to a message sent from Cuzco to Quito over 1,200 miles away, between the two capitals of the Inca empire during the civil war! The message had to be told over and over again more than 600 times, and each time the original message changed a little. The same happened to any reply. Just try to imagine what this did to any attempt to solve a dispute! Of course, this does not mean that if the Incas had telephones they could have averted a bloody civil war. Who knows. But I am sure they would have united against Pizarro."

"What caused the civil war?" asked Sophie.

"It was the rivalry of two half-brothers, sons of the Inca emperor Huayna Capac who had just expanded the empire to Quito. You see, there is a

legend to all this. Let me tell you the legend of the black-cloaked chasqui. This may very well be how it all began."

"Who was this black-cloaked chasqui?" asked Sophie.

"Some people say it was death itself in disguise."

"How awful!"

"It had to happen. You see, this mysterious chasqui came to announce the arrival of bearded white men who came from the sea. That was Francisco Pizarro's second expedition in 1526. The messenger brought a small casket. He arrived at a time when Huayna Capac was haunted by bad omens. One night he imagined he saw thousands of silent ghosts surrounding him. Well, the emperor took the casket and opened it. Moths and butterflies flew out. That was the begining of the plague, possibly small pox brought by the Spaniards. Nearly 200,000 natives died. One of them was the emperor Huayna Capac himself."

"But before dying, he named his son Huascar in Cuzco to take his place. Trouble began. Atahuallpa, brother of Huascar, who was with his father in Quito at the time, was very unhappy that he had not been named emperor. He was furious with his brother. Why did his father choose this distant son who did not fight alongside with him? Atahuallpa had just helped his father conquer vast lands for the empire, and he got nothing? So he rebelled against his brother, the new emperor, and proclaimed himself King of Quito, a separate empire. That started the war of the brothers. In one battle alone, more than 150,000 warriors died. The Inca empire was coming undone. This is when Pizarro arrived with his 168 men."

"Atahuallpa hesitated. He did not attack right away, but wanted to check out these bearded white men. Perhaps Viracocha was involved in all this. This gave time for Pizarro to enter Cajamarca and to set a trap in the center of the deserted town. The Incas were all camped five miles away. Pizarro invited Atahuallpa to visit him in Cajamarca. The Inca accepted, fully intending to capture the Spaniards in the end. He cut the escape route to the coast. But Pizarro had a trick of his own waiting."

"When Atahuallpa and his escort reached the center of Cajamarca, they were met by a priest, friar Valverde, who asked the emperor to surrender and pledge allegiance to the King of Spain. The emperor of the Incas thought this was some joke. Surrender? But at that moment the Spanish soldiers sprang out of their hiding places on horseback and headed straight for Atahuallpa, capturing him. Once their leader was taken, his soldiers fled."

"What good was a captured king?" asked Sophie. "The Spanish were outnumbered almost 100 to 1."

"Yes, they were scared. But Pizarro thought that Atahuallpa was as valuable to them as he was respected by his people. So the Spanish treated the emperor very well. They let him have his servants and to continue to rule from captivity. It worked. The Incas did not attack."

"Then Pizarro tried something else that might give them more time before reinforcements arrived. He promised to free Atahuallpa once the Incas filled a huge room with gold and silver. In half a year, over 24 tons of treasure had been delivered."

"You see, Sophie, gold and silver were not money for the Incas. Not at all. They simply admired the beauty of those precious metals. To them gold was the sweat of the sun, and silver the tears of the moon. They made beautiful figurines, like the one that my grandfather Don Martin found."

"That was part of the treasure of El Dorado," remembered Sophie. "What happened to it?"

"It's here. I never showed it to you?"

"No." Sophie shook her head.

"Oh, no! How could I forget." Don Julio led Sophie to a small room lined with bookshelves holding ancient manuscripts. "This is a very precious room Sophie, and one day if you like I'll show you what's on these shelves. But for now, this will do." He opened a large drawer and pulled out a thin golden llama that fit in the palm of his hand. The shiny animal with large eyes and pointed ears seemed to smile.

"It's beautiful." Sophie took the llama carefully and caressed its head.

"It's the heart of Babel." Don Julio grinned. "You see, my grandfather used it as collateral for the loan that got this place going. And look what he did. In here, within these walls, on all the shelves you see are the pieces of our world as we know it. You put all these books together and you get what we think the world is all about, and the entire universe as well. It's all here. But it's not a library, mind you. Anyone can come in here, browse, buy a book and take it away. Then I fill the empty spot with a new book, something else, something I like. Ah, the written word, Sophie, that's the heart of history. And the Spanish gave the Incas a history since they had no written language. Isn't that funny? Because of them, the Incas are now history." Don Julio began to laugh at his own joke, but Sophie did not think it was that funny.

"Really, uncle," she said frowning. "So what happened to Atahuallpa?"

"Well, there is an old saying: 'who lives by the sword, dies by the sword.' After the ransom was paid, they killed him."

"That's horrible!"

"It was. Even the king of Spain was disgusted. He thought Pizarro had committed regicide. Then 8 years later, Pizarro himself was murdered by some of his men."

"Why did they kill him?"

"It's not clear. It was criminal and it was a big mistake. I guess with all that gold, people were getting very greedy and wanted more. Atahuallpa was an obstacle. The Spaniards had received reinforcements by then. They did not need him as a shield anymore. Then they marched on Cuzco, plundering all the way. And once again, luck was on their side. You see, when they got to Cuzco, they were well received by the followers of Huascar whom Atahuallpa had murdered. They really thought Pizarro was Viracocha who came to deliver them from the rebels. Manco Inca was crowned emperor. He was a son of Huayna Capac and he welcomed the Spaniards as liberators."

"I remember traveling south with Don Carlos, all the way to Cuzco. What a beautiful city, way up in the arid mountains. Now it was again the capital of what remained of the Inca empire. Manco Inca fought alongside the Spanish against the armies of the rebel northern Incas who once followed Atahuallpa. But within a few years, the Spaniards began mistreating Manco Inca to the point that he decided to start an uprising against the oppressors."

"Don Carlos took us to the ramparts of the Sacsahuaman fortress on a hilltop above Cuzco. Manco Inca organized his attacks of the Spanish soldiers from there. The fortress was incredible. It took 20,000 men 30 years to build. The walls are made of rocks brought there and cut to the right shape. Some of the rocks weigh more than 100 tons. They are as big as houses. It was said that only supernatural beings could have built the fortress. But these men did it by splitting rocks with small holes then wedging them apart. Then the rocks were polished with sand and water till the fit was exact."

"Just then, as we watched Cuzco from a rampart, I felt the earth move under my feet. It was as if the earth was no longer solid and started to undulate like a sea. It was an earthquake. We had nowhere to go. Fortunately there was nothing above us that could have fallen down. We sat down on the shaking ground, otherwise we would have fallen down. The Incas believed earthquakes were caused by a god named Pacha Kuyuchick when she tossed

in her sleep. Well, she tossed a lot that day, and we held on to clumps of grass on the ground as if that would keep us from being swept away by the fury of the tremors. It was all over in a minute, and that was it. The fortress was intact. Every stone was still in its place. Those enormous stones so carefully placed one against each other, had not moved an inch. But the damage to Cuzco turned out to be extensive. The Spaniards did not build structures as solid as those of the Incas. The buildings cracked, some fell. We were totally stunned as we walked over rubble along streets that we had visited only hours earlier. Don Carlos said it was Viracocha's rage. He wanted to shake away those who had destroyed the Inca civilization."

"Were you hurt?" asked Sophie.

"Not at all. The fortress protected us, just like it protected the Incas under the command of Manco Inca. They fought hard and long against the Spanish soldiers, but eventually they had to withdraw. You see, by this time many of the other native tribes oppressed by the Incas had allied themselves with the Spaniards against Manco Inca. He moved away toward the jungle and established a new Inca capital in Vilcabamba, northwest of Cuzco. The Spaniards could hardly penetrate the dense forest and rivers that feed the Amazon. For 25 years the remaining Incas managed to resist in that remote and forbidding region, but eventually their last emperor Tupa Amaru was defeated, 40 years after Pizarro first confronted the Incas."

"But one Inca city that was never taken was Machu Picchu in the Vilcabamba region. It was Martín Marquez, remember, who helped Hiram Bingham find again that lost city at the begining of this century. It is very possible that Machu Picchu was the last capital of the Inca empire."

Don Julio told Sophie that Quechua, the language of the Incas survived. In modern Peru, Quechua is one of two official languages. The other one is Spanish.

"And that's the story of our two year adventure from Puerto Rico to Peru, along the route of the conquistadores. It was an unforgetable adventure. From Peru we then returned to Uruguay via Bolivia, Chile and Argentina."

"Have you gone back since then?" asked Sophie.

"No, but some day I will."

"When you do, please take me along uncle."

"Oh, yes." Don Julio smiled at Sophie who looked so much like his sister. "Certainly yes. That will be quite an adventure again."

EXPLORATIONS FOR VIRACOCHA

1 - Send messages by relay, the way the chasquis did. Explore how the message gets distorted the more relays there are and the more complex it is.

2 - Explore the rise and fall of the Inca empire. How was it formed? What held it together? What brought it down? Explore the value of having formed such an empire. Was it worth? Compare to other empires such as the Roman empire, and more recent ones in the 20th century. Can there be empires anymore? Compare different political systems to the federal democratic system in the U.S. Explore the function of the United Nations.

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